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ON THE LENINIST COURSE

These days the eyes of all Soviet citizens and our millions of friends abroad are again turned toward the capital of the homeland of the October Revolution -- Moscow, toward the great party of Lenin, which is confidently guiding the mighty ship of state -- the Soviet Union, along the proven Leninist course.

Our country's outstanding success in fulfilling the Eighth Five-Year Plan and grandiose plans for further progress by the USSR along the road to communism, presented for discussion at the 24th CPSU Congress, constitutes new evidence of the revolutionary-transforming force of Marxism-Leninism, the potential of the socialist system and loyalty of party and people to the behests of Lenin.

At all stages in the history of the Soviet Union Communist Party congresses have played a special role in the life of party and people. They have always been major landmarks in the selfless struggle for implementation of the general line of the CPSU and Lenin's deathless doctrine on building socialism and communism. The 24th CPSU Congress, which signals the nation's entry into a new stage in the building of communism, will take its rightful place in their ranks.

The party has come to this congress as a solid detachment of people of like mind, a party enriched by the experience of guiding a multimillion army of builders of communism. The CPSU is guided by a scientifically elaborated Marxist-Leninist program of action and is unswervingly carrying out a policy aimed at further strengthening the economic and defense might of the state, at strengthening the cause of peace and security of peoples. The Soviet people is solidly ranked around its party, totally dedicated to its ideals, and is firmly following it toward new accomplishments in the name of the triumph of communism.

The building of a communist society is an extraordinarily complex and all-encompassing process. It encompasses all aspects of societal affairs: economics, politics, ideology, culture, and international relations. The CPSU has a masterful command of the Leninist art of finding the main element, determining at each stage in history the central task and mobilizing the inexhaustible energy of the masses for successfully accomplishing these tasks.

The famous five-year plans constitute a concrete expression of the party's economic and social strategy. The idea of five-year planning was born during the course of building socialism. It was anticipated by Lenin. In one of his last articles, discussing the prospects for the development of

Soviet society and the problems of managing it, Lenin wrote: "...We have now received the opportunity, rather rare in history, to specify the requisite timetable for producing radical social changes, and we now see clearly what can be done in five years and what requires much more time..." (Poln. Sobr. Soch. [Complete Works], Volume 45, page 385).*

Experience in successful implementation of the GOELRO Plan, drafted under Lenin's guidance, as well as practical experience in planned management of the economy during the first 10 years of Soviet rule constituted the basis for drafting the first and subsequent five-year plans for development of the Soviet economy. Each five-year plan was a new, higher stage of maturity of Soviet society, a major step on the path of social progress.

The world-historic successes achieved by the Soviet people in building the new society convincingly affirm the grandeur and vital strength of the root tenets of Marxism-Leninism on the decisive role of the masses in the sociohistorical process, the guiding and directing role of the Communist Party -- inspirer and organizer of all our victories.

The scientific character of CPSU policy and the realistic nature of the plans and tasks it puts forth are based on strict consideration and intelligent utilization of the objective laws governing societal development as well as the inexhaustible creative energy of the toiler masses -- the producers of material and spiritual goods. A Marxist, taught Lenin, "must reckon with objective facts, the masses and classes..." (Volume 31, page 157). Vigorously opposing spontaneity and inertness, he at the same time sharply condemned voluntarism, separation from the masses, unfulfillable promises, and the advancement of tasks for the accomplishment of which conditions are not yet right. "We value communism only," Lenin stressed, "when it is economically well founded" (Volume 38, page 179). He stated that "the party program cannot remain merely a party program. It must be transformed into a program of our economic development..." (Volume 42, page 157).

Lenin saw in increased labor productivity and organization of labor on the basis of the latest scientific and technological advances a root condition for creating a social system which would be higher than that of capitalism. He considered the living productive potential of the masses to be the most decisive and marvelous productive force of the socialist society; new social being in the masses engenders new social consciousness, which is transformed into a powerful material force. The Communist Party relies on this in accomplishing all economic and sociopolitical tasks. The party faithfully follows the instructions of Lenin, who formulated as

* Henceforth when referring to this source we shall indicate only volume and page.

follows one of the most important laws discovered by Marxism, governing social development: "The greater the scale, the greater the breadth of historical actions, the greater the number of persons participating in these actions; the deeper the transformation we wish to effect, the greater the extent to which it is necessary to raise interest in it and a conscientious attitude, to convince more and more millions and tens of millions of people of this necessity" (Volume 42, page 140).

Constituting a well-organized, ideologically toughened vanguard of the worker class and the entire people, closely bound to the masses, our party gives a planned and purposeful character to the entire process of building communism. Unity of revolutionary theory and practice, word and deed, is a characteristic feature of the activities of the Communist Party, which is armed with the all-conquering doctrine of Marxism-Leninism.

"Looking back at the path we have trod, one can state that our people, our party have reason to be proud," stated L. I. Brezhnev. "The Soviet people has experienced many difficulties and much adversity. Enormous historical responsibility has lain upon its shoulders. But it has courageously and steadfastly withstood all trials and has honorably carried out its great mission. Always and everywhere, at times of severe tests and savage battles, at times of joyous victories and bitter setbacks, our people has remained loyal to the Leninist banner, loyal to its party and the cause of revolution."

Following Lenin's behests, the CPSU in its Program adopted at the 22nd Party Congress, scientifically defined the triune main task in building communism: creation of a powerful material and technological base, further improvement of societal relations, and indoctrination of the new man. The resolutions of the 23rd Party Congress and a number of Central Committee plenums have specified the scale, timetable, ways and means of accomplishing this world-historic mission, taking into account the present situation and our nation's realistic potential. The results of the Eighth Five-Year Plan are of great importance for its implementation. It is well known that this last five-year plan was successfully fulfilled in the major economic and social indices.

Implementing the resolutions of the 23rd CPSU Congress, the Soviet people has written a new and brilliant page in the chronicle of struggle for the triumph of communism and for a bright future for mankind. The principal result of this past five-year plan has been the fact that the Soviet state has become stronger and more powerful in all respects. Its economic and defensive might have increased, while its political foundation and international prestige have become even stronger. Major success has been achieved in development of all branches of the economy, in accomplishing social tasks and in raising the material and cultural living

standards of Soviet citizens. The moral and political unity of our society has become strengthened, and socialist democracy has obtained further development.

We are pleased first and foremost by achievements on the main bridgehead of the struggle for communism -- in economic development. The economy has grown at a rapid rate and more effectively than in the preceding five-year plan. The rate of improvement in living standards has also substantially accelerated. Industrial output volume rose 50 percent in the five years, while national income has risen 41 percent. Those branches of industry ensuring technological progress in the economy and improved efficiency of production have grown particularly rapidly: electric power engineering, machine building and metalworking, instrument engineering and electronics, chemicals and the petrochemical industry. All modes of transport and communications have experienced further development. We have seen an improvement in farm crop yields and livestock productivity. Average annual gross output volume in agriculture was 21 percent higher than in the preceding 5-year period. The nation's economic potential has grown; fixed productive capital in the economy has increased by 50 percent.

The Soviet economy has acquired impressive strength. In 1970 alone industrial output was almost double that of all the prewar five-year plans combined. Growth in fixed productive capital during the last 5-year period exceeds the volume of all Soviet fixed productive capital at the end of 1955. In the last year of the five-year plan this country produced the biggest grain and cotton harvest in the history of our nation's agriculture. The USSR now produces almost 20 percent of world industrial output. The following figures constitute practical embodiment of Lenin's ideas on national electrification: in 1970 we produced 740 billion kilowatt hours of electric power, or 148 times as much as in 1928, at the beginning of the First Five-Year Plan. This is equal to the combined electric power output of such highly-developed capitalist nations as England, France, West Germany, and Italy.

Soviet science has made a major contribution toward solving the vital problems of development of social production. Achievements in the basic sciences have made it possible successfully to accomplish many scientific and technological tasks: adoption of high-productivity machine complexes, new industrial processes, automated systems of enterprise management and control of complex production processes with utilization of computer hardware, etc. New and outstanding achievements by the Soviet space program constitute persuasive evidence of the high level of development of Soviet science and technology. On 12 April 1971 all progressive mankind will celebrate the 10th anniversary of a signal event, when the spacecraft Vostok, piloted by cosmonaut Yu. A. Gagarin, accomplished the world's first manned orbital flight.

The party and people have successfully coped with the difficult task of combining further development of the economy and strengthening of the nation's defense capability with a substantial acceleration in the rate of consumer goods production and growth in toiler living standards.

Scientific and technological progress, improvement in economic management and adoption of new methods of planning and economic incentive have promoted improved efficiency of social production and increased labor productivity. On this basis we have secured a substantial improvement in living standards for Soviet citizens. Real per capita income rose 33 percent during the 5-year period; average monthly wages of blue-collar and white-collar workers rose 26 percent, while kolkhoz member earnings rose 42 percent, which exceeds the targets specified by the 23rd CPSU Congress for these items. The population's consumption of consumer durables and foodstuffs has risen substantially. Housing has improved for almost 55 million citizens. The service industry has experienced further development. Payments and benefits to the population from public consumption funds, which comprised 262 rubles per capita in 1970, increased by more than 50 percent.

The general educational and cultural level of Soviet citizens is rising steadily. We are steadily achieving a transition to universal secondary education of our young people and are building new schools and preschool facilities. During the 5-year period we produced 2.6 million specialists with higher education, 4.5 million with secondary specialized training, while 7 million skilled young workers were produced by our trade schools. Medical services and organized recreation facilities for the public improve year by year. We are building more and more motion picture theaters, recreation clubs, libraries, and the total number of privately-owned radios and television sets is increasing. There has been an appreciable increase in reader demand for books, newspapers, and magazines.

The selfless labor of the worker class, kolkhoz peasantry and popular intelligentsia, guided by the Communist Party, is producing abundant fruit. Together with substantial economic growth, development of science and technology, the decisive foundations of the Soviet governmental and societal system -- the alliance of workers and peasants, friendship among the peoples of the USSR and their moral-political unity -- are becoming stronger. Celebration of the Lenin Birth Centennial and preparations for the 24th CPSU Congress constituted a wonderful demonstration of the monolithic solidarity of the Soviet people behind the Communist Party and its Central Committee. The toilers have expressed and are expressing with new force an unshakable loyalty to Leninist ideals, our party, and resolute determination to continue following the path of Lenin under party guidance.

Success by the Soviet people in building the material and technological foundations of communism and implementation of the Directives of the 23rd CPSU Congress are of enormous international significance. They strengthen the position of the world socialist system, enhance the international authority of the USSR and promote intensification of the struggle by the forces of peace and democracy against imperialism, for national independence and socialism. These successes graphically demonstrate the indisputable advantages of the socialist system over the capitalist and serve as an inspiring example for the toilers of all nations.

Implementing Marxist-Leninist doctrine, developing and enriching it under new historical conditions, the CPSU is elaborating a scientific policy, an integral and well-balanced system of effective measures, implementation of which brings the Soviet people closer to the victory of communism. With each new stage in the development of the socialist society, realistic possibilities develop for accomplishing increasingly large-scale economic and sociopolitical tasks. Lenin's prediction has come true that "socialism harbors gigantic strength and that mankind has now advanced to a new stage of development which contains unusually excellent potential" (Volume 45, page 402).

Following Lenin's behest to proceed steadily forward, to achieve greater victories and to move from less difficult to more difficult tasks, the Communist Party at its 24th Congress is opening up new and inspiring prospects for the further movement of Soviet society along the road to communism. An important stage on this journey will be the 1971-1975 Five-Year Plan for Development of the Soviet Economy.

The main task of the Ninth Five-Year Plan is to secure a substantial upswing in material and cultural living standards on the basis of a high growth rate for socialist production, improvement of production efficiency, scientific-technological progress and acceleration of labor productivity growth.

The Leninist party, guided by the objective laws of societal development, has scientifically formulated both the fundamental goals of social production at the new stage of its maturity, as well as realistic ways, methods and means of achieving these goals. A central element in the new five-year plan is the task, defined by the CPSU Program, of all-out development of the material and technological foundation of Soviet society, a steady growth of the socialist economy and securement on this basis of a substantial improvement in toiler living standards.

It is planned to increase industrial output by almost 50 percent over the 1970 level. Thus the average annual industrial growth rate will be more than 8 percent. With the present industrial output volume this will

produce substantial growth in all basic areas of heavy and light industry. As regards consumer goods output, in the forthcoming five-year period the growth rate will be somewhat higher than for means of production. This corresponds to the principal task of the new five-year plan.

Output of the major categories in heavy industry will reach even higher levels in the five-year plan presently under way: steel, petroleum, coal, and electric power. The growth rate in machine building and metalworking, chemicals, the petrochemical industry and other branches determining technological progress throughout the economy will be higher than the overall average level. The bulk of industrial output growth will be achieved as a result of a substantial increase in labor productivity.

In the area of agriculture a program for further growth in crop and livestock production has been specified and is being implemented. The target calls for a substantial increase in the average annual volume of agricultural output in comparison with the preceding 5-year period, securing fuller satisfaction of the public's growing requirements in foodstuffs and industrial demand for raw materials. Agriculture will be given substantial material and technical assistance to achieve this target, assistance which will promote a rise in labor productivity on kolkhozes and sov-khozes.

Transport and communications will grow in close coordination with the new upswing in industry and agriculture. The overall capacity and flexibility of the transportation system will improve; freight traffic will increase for all modes of transport, and much will be accomplished to improve the operations of communications, radio and television broadcasting.

The principal goal of party plans is further improvement of living standards and comprehensive development of the socialist society. A substantial growth in national income, achieved by means of increasing labor productivity, will make it possible substantially to increase per capita real income, average earnings of blue-collar and white-collar workers as well as kolkhoz member earnings in the communal farm operation. Public consumption funds will rise substantially by the end of the five-year plan, which will have a very palpable effect on improving Soviet living standards. Health services, public education, training of specialist cadres and toiler pension benefits will rise to a new level. There will be considerable increase in commodity resources and retail trade, with improvement in variety and expanded public services. Housing construction will continue to grow and expand.

For satisfaction of the people's growing intellectual needs, there will be further development of the press, literature and art, radio and television

broadcasting, growth in the network of cultural-educational establishments and the entire system of cultural services for our citizens, with an enhancement of its aesthetic and ideological-indocctrinational role.

Economic and sociopolitical problems are resolved in an organic unity in the program of building communism, drafted and carried out by the party. This is in full conformity with the root tenets of Marxism-Leninism on the closest objective interlink between material and spiritual factors in societal affairs. Economic and social tasks are also organically combined in the new five-year plan. Development of socialist social production is exerting decisive influence on the social being of Soviet citizens, which in turn defines their spiritual countenance, social consciousness, and promotes the forming of "comprehensively developed and comprehensively trained individuals," as Lenin predicted (Volume 41, page 33).

Such targets of the new five-year plan as acceleration of the pace of scientific and technological advance, improvement in the effectiveness of social production, adoption of improved forms and methods of economic management, and solution to problems of placement of productive resources and territorial economic links are not only of enormous economic but also of social importance. Further development of the material and technological foundation constitutes a decisive condition for raising the people's living standards and cultural level, the principal foundation for improving communist social relations. This is particularly important for overcoming the differences between city and village, between mental and physical labor, for producing a harmoniously-developed builder of the new society. Development of the economy and culture of the union republics and enhancement of the role of local soviets are specified, in the spirit of the overall economic strategy and Leninist nationalities policy of the CPSU.

Successful solution of sociopolitical problems, growth in Communist consciousness and culture of Soviet citizens, increase in their general and specialized knowledge, skills, improvement in living, working, housing and recreation conditions in turn have a most beneficent effect on the people's productive activities, labor productivity and in the final analysis on speeding the pace of economic development. Conscientious, well-organized, highly-productive labor is the source of the nation's wealth, of all material and spiritual goods.

Harmonious development of all aspects of the material and spiritual affairs of Soviet society in the interests of man is dictated by the nature of the socialist system, by its advantages over an exploiter system. It is a well-known fact that the high level of economic, science and technology development achieved in a number of imperialist nations not only is

failing to improve the situation of the toilers and their material and sociopolitical conditions, but is leading to even greater enslavement and oppression. The capitalist, the rich farmer and banker reap all the major benefits of scientific and technological progress and the improved labor productivity of the industrial and farm worker. To the former goes the lion's share of the material goods created by the efforts of the toilers. The theories of "popular capitalism" and "unified industrial society" widely publicized by bourgeois ideologues are aimed at carrying the class command of the monopolists -- to embellish capitalism, to play down its antipopular, exploiter essence. The poverty and suffering of millions of people in the capitalist nations refute such "theories."

The advantages of socialism, objectively contained in its socioeconomic nature, are not manifested spontaneously and automatically. Their realization is the result of the selfless labor of millions of toilers, the organized and purposeful development of social production and the intellectual activities of the people, carried out under the scientific guidance of the Communist Party. The colossal scale of the nation's economy and the new, magnificent prospects of its mighty upsurge insistently demand further improvement of the system and methods of management and planning in the interest of intensification of production and improvement of production efficiency. This is the fundamental line of Soviet economic growth both for the immediate and more distant future.

The party intends to carry out during the new five-year plan important measures aimed at improving management of the economy, planning and economic incentive for production, employment of advanced hardware, economic-mathematical methods, and automated systems in this area. Improvement of scientific organization of labor, even more extensive involvement of toilers in economic management, and strengthening of state discipline at all levels will substantially promote successful accomplishment of material-technological and social tasks.

The tasks of Soviet science, its role in organizing socialist production, efficient solution to the vital problems of economic development, development of social relations and education of the new man are becoming immeasurably more important at the present stage of building communism, with its gigantic scope and increased demands, under conditions of an intensifying scientific and technological revolution. Basic and applied scientific research and rapid incorporation of research results in the economy are acquiring enormous significance. It is planned to achieve further elaboration of problems of theoretical and applied mathematics, cybernetics, nuclear physics, solid state and semiconductor physics, quantum electronics, and low temperature physics. The space program will be continued, as will scientific effort in the fields of geology, geophysics and geochemistry, oceanography, atmospheric physics and geography, biology and medicine.

The increased role of the social sciences and the need of their further development constitute an objective pattern and natural law. The party and workers on the scientific theory front are doing much in this area. The theoretical and political documents of the party Central Committee pertaining to the 50th Anniversary of the October Revolution, the sesquicentennial of the birth of Karl Marx, the Lenin Birth Centennial, proceedings of party congresses and Central Committee plenums constitute a major contribution toward creative synthesis of the wealth of experience in building communism in this country and scientific elaboration of its development prospects. The well-known Central Committee CPSU decree entitled "Measures for Further Development of the Social Sciences and Enhancement of Their Role in Building Communism" constituted a vivid manifestation of party concern for improving ideological-theoretical effort.

One of the most vital tasks of the social sciences is organization of comprehensive research on modern processes of social development, improvement of the system and methods of scientific guidance of the economy for the sake of more successful and rapid solution to the problems of building communism

In connection with the increased role and tasks of Soviet science, the rapid growth of scientific establishments, centers and scientific cadres, organization and planning of scientific research, experimental design efforts, and the concentration of scientific manpower, material and financial resources primarily on major areas of science for solving the most important scientific-technological and sociopolitical problems is acquiring particular importance. The party demands an all-out strengthening of the bond between science and production, practical activities, as well as effective measures to incorporate and adopt new technology on an accelerated schedule, with a closer watch on progress and fulfillment of scientific effort plans.

Building history's first communist edifice and developing the economy, science, technology and culture in the interests of the toilers, our party and people are carrying out their international duty and are making an important contribution toward strengthening the entire community of socialist nations, the forces of peace and democracy. Economic and scientific-technological ties with the socialist nations in the area of strengthening their alliance and consistent economic integration of the economies of the CEMA member nations will develop further during the new five-year plan. Soviet foreign trade volume will increase by at least one third.

The CPSU Program states that the party views the building of communism in the USSR as a great international task of the Soviet people, corresponding to the interests of the entire world socialist system, the interests of the international proletariat and all mankind. Implementation of the

Ninth Five-Year Plan and further growth in the economic and defense might of the Soviet Union will be of enormous international significance, will serve to multiply the strength of the world socialist community, will once again demonstrate the advantages of a planned economic system and will strengthen the position of all progressive forces struggling for peace, democracy and socialism.

One of the fundamental laws governing the development of Soviet society is an increase in the guiding and directing role of the Communist Party. This is dictated by a number of objective factors: growth in the scale and complexity of the tasks of building communism; an upsurge in the productive activity of the masses and involvement of more and more millions of toilers in management of the affairs of state and of production; further development of socialist democracy, enhancement of the role of public organizations, and broadening of the powers of the union republics and local organizations; enhanced significance of the theory of scientific communism, its creative development and propaganda, as well as the necessity of intensifying communist indoctrination of toilers and the struggle to overcome the vestiges of the past in people's consciousness. This is dictated also by a broadening of the international ties and tasks of the Soviet state, by aggravation of the struggle between two systems -- socialism and capitalism -- in the world arena, and by the necessity of ensuring favorable external conditions for building communism.

History persuasively confirms that our Communist Party, loyal to the behests of Lenin and the doctrine of Marxism-Leninism, is honorably carrying out its leadership and guiding role. Supported by the broad masses, which are accomplishing world-historic reforms, it is successfully achieving program goals, perspicaciously gazing into the future, revealing to the people scientifically-substantiated ways to move forward, is arousing enormous energy in the masses and is boldly leading them toward the accomplishment of new tasks.

The period between the 23rd and 24th CPSU Congresses was characterized by a further ideological and organizational strengthening of the party and its local organizations, by a broadening and consolidation of their bond with the masses, and by a new upswing in political and labor activity on the part of Communists and all Soviet citizens. This was vividly expressed in successful implementation of the resolutions of the 23rd CPSU Congress, the economic and social targets of the Eighth Five-Year Plan, in a new upswing of toiler socialist competition for honorably moving toward the 24th CPSU Congress, and in unanimous approval by the entire party and people of the draft Congress Directives on the 1971-1975 Five-Year Soviet Economic Development Plan. Ideological activities of party organizations and their ideological efforts with the masses have become substantially activated.

On the eve of the Congress report-election meetings in primary party organizations, at which approximately 3 million Communists spoke, rayon, city, oblast and kray party conferences, and union republic Communist Party congresses were held in a highly businesslike atmosphere, in an atmosphere of a high-principled approach to accomplishing vital tasks, with extensive development of intraparty democracy, criticism and self-criticism. They graphically demonstrated the solidarity of the multimillion-man detachment of Communists behind the Leninist Central Committee, their readiness and ability successfully to accomplish the new and magnificent tasks of building communism.

The Soviet people has become convinced on the basis of vast historical experience that everything it has achieved in building a new society -- the economic and defense might of the Soviet Union, radical improvement in toiler living conditions, the solid position and great authority of the state in the international arena, and inspiring prospects for the future -- all this is inseparably linked with the tireless activities of the Communist Party, its all-conquering ideals and policy, its loyalty to the behests of the great Lenin.

In a spirit of Leninism the party is innovatively solving all problems, including those related to defense. To be constantly on guard, to ensure the nation's defense capability and to strengthen the army at all costs are instructions issued by Lenin which have been and remain for the party and people a lodestar in organization of the armed defense of the conquests of the October Revolution and securement of our nation's security against the aggressive intrigues of imperialism. The strength of the Leninist doctrine on defense of the socialist homeland has been confirmed by the rich experience of history. It has withstood the test in severe battles against the enemies of our homeland during the Civil War and Great Patriotic War.

In drafting plans for building communism, our party does not forget for a single moment that a solid peace and favorable external conditions are necessary for the Soviet people to implement these plans. Other peoples, all progressive mankind are vitally interested as well in preserving and strengthening peace. But under conditions of the stepped-up aggressiveness of imperialism, headed by U.S. reactionary ruling circles, a desire for peace would constitute a pacifist illusion if this desire were not supported by the growing economic and defense strength of the Soviet Union and the other socialist nations as well as their ability to defend the cause of peace. Carrying out the demands of the CPSU Program and the resolutions of the 23rd CPSU Congress, the Central Committee CPSU and Soviet government are firmly and unswervingly moving toward strengthening peace and international security, toward consolidation and support of all peace-loving forces.

The increased combat might of the Armed Forces and their high degree of combat readiness constitute a decisive means of ensuring the peace and security of our homeland, alongside the consistent peaceful foreign policy of the USSR. An inseparable bond with the people and the total guidance exercised by the Communist Party constitute the main source of the strength and invincibility of the Soviet Army and Navy.

Tireless concern by the party, government and people for strengthening national defense, as well as success in developing the Soviet economy, science and technology make it possible to achieve a high level of technological sophistication of all branches and arms of the Soviet Armed Forces, as well as maintenance of their combat efficiency with consideration of the demands of modern warfare. This applies first and foremost to strategic weapons.

Marxism-Leninism teaches us that the military strength of the state and its defense strength are organically dependent on the nature of the nation's social system, the level of development of its economy, science and technology, and the degree of unity between army and people. This relationship is becoming even stronger today. This is why our party always bears in mind the necessity of strengthening the defense capability of the USSR in elaborating the main directions of development of the economy and implementation of plans for economic and social reforms, which are of a peaceful, productive nature. This has also found expression in the directives for the Ninth Five-Year Plan. It is emphasized that the new five-year plan will ensure further growth to the defensive might of the Soviet Union, and this will make it possible even more reliably to defend the Soviet people and all nations in the socialist community against the danger of imperialist aggression, and will strengthen the position of peaceful and liberation forces throughout the world.

The Soviet Army and Navy constitute a mighty force which presents an ominous barrier to our enemies. They are armed with first-class weapons and the most sophisticated combat equipment. But their main force and strength is comprised of people, our outstanding soldiers and sailors, sergeants and petty officers, officers, general officers and admirals -- ardent patriots and internationalists who are totally dedicated to the homeland, the cause of the party and the great ideals of communism.

Our fighting men are solid with the people. They unanimously approve and actively support the wise policy of their party and are making a worthy contribution toward building a communist society through their selfless labors and reliable defense of the conquests of socialism. Army and navy combat training and combat readiness have risen to a new and even higher level in the Lenin centennial year, in the period of preparation for the 24th CPSU Congress. The number of outstanding performers, proficiency-rated

specialists, and outstanding subunits, units, naval ships and large units has grown substantially. Communists and Komsomol members, comprising more than 80 percent of personnel, constitute the vanguard of military collectives. This is an enormous cementing and inspiring force, skillfully guided by commanders and political officials toward successfully accomplishing complex and responsible missions assigned the Armed Forces by party and government.

Minister of Defense USSR Mar SU A. A. Grechko states that the principal task of the men in our army and navy is all-out improvement in the combat readiness of each and every subunit, unit, naval ship and large unit -- the entire Armed Forces as a whole. To achieve this we must constantly improve military and political knowledge, learn even better mastery of weapons and equipment, learn to utilize them efficiently under complex situation conditions, and we must constantly improve vigilance. All indoctrinational effort in the army and navy should be directed toward this end.

There is no doubt whatsoever that the great work, permeated with deep ideological content, which is presently being undertaken by commanders, political officials, party and Komsomol organizations in connection with study and dissemination of the materials of the 24th CPSU Congress will promote a new upsurge in the political and productive activity of our fighting men, as well as a further increase in the combat readiness of the Armed Forces.

Military science, an intensification of military scientific research and their close link with current problems of military organizational development, its immediate and long-range prospects are acquiring increasing significance in improving the combat might of army and navy. Lenin's statement that a modern army cannot be built without science is highly applicable today as well. It is particularly important to elaborate a system, forms and methods of scientific troop control, troop training and indoctrination, taking into account the demands of the scientific and technological revolution. The science of management and control is to a large extent the modern science of gaining victory. This is why mastery of this science and its development constitute a vital task for military cadres. They are being given inestimable assistance in this effort by a thorough study of the Lenin military theory legacy, party decisions and other CPSU documents.

The Soviet people and its fighting men are in an excellent, joyous mood. They are bursting with patriotic pride in the great accomplishments of past five-year plans and are firmly convinced that the new and magnificent

party targets will be met. Unswervingly following the path of Lenin, party and people have achieved world-historic success in building socialism and defending our homeland against aggressor encroachments. We shall stride to a total victory of communism by following the Leninist course and under the tested and proven guidance of the party!

QUESTIONS ON THE HISTORY AND THEORY OF MILITARY SCIENCE

Maj Gen V. Zemskov, Candidate of Military Science

Under conditions of further aggravation of the general crisis of capitalism and the progressing military-technological revolution, CPSU military policy and military science are playing an increasing role in the efficient readying of our nation and army to repel and defeat the aggressive forces of imperialism.

The article entitled "Scientific Foundations of Party Policy in Military Affairs" examined the tasks and content of military policy, its correlation and links with military science and doctrine.

This article continues an analysis of certain aspects of the history and theory of Soviet military science.

From the History of the Development of Military Science

The military science of the first proletarian state did not develop out of thin air. As in other fields of knowledge, military science also possesses its sources of an objective and subjective type. Soviet military science, brought to life by the historical necessity of defending the conquests of the Great October Socialist Revolution, was born in the class battles of the Russian proletariat, which preceded the Great October Revolution. It was formed in the course of savage battles between the old and new world in the period of foreign military intervention and civil war, 1918-1920, and received further development during and after the Great Patriotic War. Soviet military science, from the very outset formed on the basis of the philosophy and methodology of Marxism-Leninism, on the basis of the revolutionary experience of a rising class, at the same time creatively imbibed the achievements of domestic and foreign military thought and practice from the very first.

It is appropriate in this connection briefly to mention several key moments in the history of military science. Its sources reach far into the past. Originally, when the societal practices of ancient times, the level of knowledge and conditions of its dissemination were limited, when the printing press did not exist, military science was of an extraordinarily narrow empirical nature. Works on war were almost not even differentiated from general philosophic and historical literature, and most frequently were limited to a description of various military campaigns. A certain contribution to the development of military affairs in those times was made by the nations of the East, Egypt, Greece, and Rome. Friedrich Engels cites information on the Greek armies from ancient sources characterizing the

development of military theory. Engels wrote that they were the first about whose organization we possess extensive and precise data (Izbrannyye voyennyye proizvedeniya [Selected Military Writings], Voenizdat, 1958, page 139). One can state that the history of tactics, and particularly infantry tactics, begins with these sources.

The age of feudalism in Europe encompasses a very long period, several centuries. Although within the framework of this period one can distinguish a number of unique features in the development of military affairs, on the whole development proceeded slowly, right up to the appearance of firearms in Europe in the 14th century. Of the works on military theory from the late feudal era, we should mention the Treatise on the Art of War by the Florentine Machiavelli. This work, however, and other writings did not signify the formalization of military science as a system of knowledge. They constituted preparatory materials for subsequent theoretical synthesis and conclusions.

The genesis and formalization of military science took place essentially in the 18th century. The development of productive resources, the growth of scientific knowledge on nature and discovery of a number of laws demonstrating the universal linkage of phenomena made it possible for the development of a method of comparative-historical approach to such societal phenomena as war. It is true that this method was primarily of a metaphysical character, but nevertheless it did promote a certain cognition of military phenomena.

At the end of the 18th century the works of Lloyd and Bülow were published, the first to view military strategy as the core of military science. Bülow, for example, was the first to demonstrate that "political strategy applies to military strategy just as the latter applies to tactics." He defined strategy and tactics.

The French bourgeois revolution exerted great influence on the development of military science. Lenin stated: "Just as the French revolutionary people displayed on the domestic scene a maximum of revolutionary energy which was unprecedented in history, so it displayed in the war at the end of the 18th century the same gigantic revolutionary creativity, creating an entire system of strategy, departing from all the old laws and customs of war and creating a new, revolutionary, popular army and a new method of warfare in place of the old" (Poln. Sobr. Soch. [Complete Works], Volume 32, pp 79-80).

The birth and establishment of bourgeois military science was also closely linked with the names of Napoleon, Jomini, Clausewitz and other military leaders.

Important landmarks also marked the development of Russian military theoretical thought. Substantial influence on its formation was exerted by the military reforms of Peter the Great, the writings of P. A. Rumyantsev, the activities of A. V. Suvorov, M. I. Kutuzov and other generals. We know, for example, that at this time Russian military-theoretical thought had already expressed the idea of the link between military affairs and politics, that politics gives "the helm to the military." Long before Clausewitz, a Russian military theorist, the Decembrist Burtsov, not only pointed to the connection between war and politics but even specified the necessity for military science not to limit itself to the narrow framework of the art of war but to *include the study of other factors as well*. By the middle of the 19th century the writings of Russian military theorists had formulated fairly precisely certain fundamental principles of the art of war. A study by A. I. Astaf'yev entitled O sovremennom voyennom iskusstve (Modern art of war), published in 1856 and 1861, stated quite plainly that *the theory of the art of war constitutes a science*. We later find this idea in the writings of Leyer, Mikhnevich and others.

Every science has an applied significance. This is particularly true of military science. Military science, however, *finds broad practical application only following fundamental elaboration of its principles, discovery of the laws and patterns of war*, cognition of which enables one to predict the development of military phenomena and to elaborate rigorously scientific principles of the art of war. The applied character of science is dictated by objective necessities, a unity of theory and practical action. The true power of science is manifested when it functions not only as a product and process of cognition but also as a scientific guide to action, as a method of this action. Precisely such qualities are possessed by Soviet military science, which is constructed on a foundation of Marxism-Leninism. Successes of course are also obvious in development of bourgeois military thought. One cannot, however, help but see its weak points, which reflect the flaws of the capitalist system, the detriment of a metaphysical and idealistic way of thinking.

Nonmaterialist methodology inhibited the development of bourgeois, including Russian military thought, which on the eve of World War I, although possessing a comprehension of a number of laws of warfare, nevertheless remained captive to obsolete concepts and idealist delusions.

The theoretical foundations of the military science of the proletariat began to be laid in the depths of capitalist society in the latter half of the 19th century.

Speaking of these aspects or stages in the development of military science (empiricism, theoretical generalizations, practical application), one of course must take into consideration the somewhat arbitrary nature of

such a division, for each of these aspects can be presented in pure form only theoretically, only in the interests of a more graphic elucidation of the specific features of a given period of its development. In actuality, here as in any science, the laws of materialist dialectics prevail, and the entire process of cognition is carried out with its inherent contradictions. All processes occur, one might say, in a unified expression, reflecting as a whole the extremely complex path of progressive development of military theory.

The Birth and Development of Military Science of the Proletariat

The founders of Marxism theoretically substantiated the role and significance of military problems pertaining to the proletarian revolution in connection with defense of its conquests against the forces of counter-revolution. They believed that the victorious proletariat should be ever prepared to defend with weapon in hand the cause of the socialist revolution and to crush the resistance of the exploiters. Revolutionary violence against the exploiters, constituting a response to violence on their part, is the sacred right of the toilers, who have risen up in struggle for their social liberation. *Marx and Engels initiated a genuine doctrine on war and army as a component part of historical materialism. This constituted establishment of the ideological-theoretical principles of the military science of the proletariat.*

For the first time in history, Marxism discovered the most important laws governing the development of military affairs, their dependence on the level of development of productive forces and the nature of societal relations. These latter, in the opinion of Marx and Engels, always function as a precondition for every new, major improvement in military affairs, in the development of military science. Consequently, they had revealed the dialectical relationship between methods of warfare, organization of the army, its arms, strategy and tactics and the character of the economic system, the level of development and capabilities of the economy and the political superstructure of society.

Examining military problems in the interests of the proletarian revolution, Marx and Engels demanded the scrapping, the destruction of the bourgeois war machine and the creation of a new, socialist military organization for armed defense of the dictatorship of the proletariat against its enemies.

Marx and Engels were clearly aware of the fact that great historical questions, particularly liberation of the proletariat from capitalism, under specific historical conditions are settled by force. Precisely for this reason they ascribed great importance to a mastery of military knowledge and saw in military theory a powerful weapon of the proletariat

in its struggle against capitalism. Extension of the dialectical method to the area of military phenomena was without question a most important achievement of Marxist military-theoretical thought.

With the victory of the Great October Socialist Revolution the military was in the hands of the toilers for the first time in history, and armed forces as a means of coercion began to be employed in the interests of defense of the conquests of the socialist revolution. The Soviet state set up in opposition to the imperialist armed forces and bourgeois military science a totally new, particularly in a sociopolitical respect, army and an incipient Soviet military science.

Lenin developed and applied general methodology of Marxism to elaboration of the foundations of Soviet military science. The Marxian prediction that military science of the proletariat "will be just as essential a product of the new societal relations as military science created by the revolution and Napoleon constituted an inevitable result of the new relations engendered by the revolution" (K. Marks and F. Engel's: Soch. [Writings], Volume 7, page 510) received practical embodiment in Russia. *Marxist-Leninist methodology of solving military problems played a determining role in the creation and elaboration of Soviet military science.*

Exposing the class nature of imperialist wars as reactionary and unjust, Lenin scientifically substantiated the historically logical and just nature of revolutionary wars of the toiler masses raised up in struggle for their liberation, for revolution -- civil wars, wars of national liberation, wars in defense of the revolutionary conquests of the proletariat. Lenin thoroughly analyzed the fundamental laws and features of contemporary war and the determining factors for achieving victory.

Describing the Marxist approach to phenomena of war, Lenin wrote: "As applied to wars, the fundamental tenet of the dialectic... states that *'war is simply a continuation of politics by other' (violent) 'means'...* This was always the position of Marx and Engels, who viewed each war as the *continuation* of policies of given interested powers -- and *different classes* within the nations -- at a given time" (Poln. Sobr. Soch., Volume 26, page 224).

In this Leninist definition is expressed the indissoluble link between politics and war. Politics operates here as a whole, and war as a part of that whole, as one of the means of achieving the aims of politics primarily by force of arms. "War," stated Lenin, "is a part of the whole... This whole is 'politics'" (Leninskiy sbornik [Lenin Collection], XII, page 433).

It is essential thereby to emphasize Lenin's idea that politics is a relationship of classes, particularly within the state. It is a concentrated expression of economics, the economic interests of the ruling class. And since this is so, naturally the class struggle in the capitalist countries does not terminate during the course of the war. Therefore politics as a whole of course cannot be equated with war, although the content of war includes not only military but also nonmilitary policy means. As for the socialist countries engaging in a war, that war of course does not constitute their entire politics, for during the course of the war civilian production continues to exist alongside military, the development of societal relations continues, ties are established with neutral states, etc. In short, even during war there exist traits and manifestations of politics inherent in peacetime development.

The founders of Marxism-Leninism highly praised Clausewitz's On War, which played an important role in the development of bourgeois military thought. This work constituted a first attempt at a scientific philosophic examination of war and its categories. In his Sotsializm i voyna (Socialism and War) Lenin wrote: "War is a continuation of politics by other (specifically: violent) means. This famous statement was made by one of the most profound writers on military topics, Clausewitz. Marxists quite rightly always considered this tenet a theoretical foundation of views on the significance of each given war. Marx and Engels always viewed various wars precisely from this position" (Poln. Sobr. Soch., Volume 26, page 316).

Lenin emphasized that Clausewitz's ideas on the history of wars "were made fertile by Hegel." In contrast to the metaphysicians, Clausewitz utilized the dialectical method (on an idealist basis, to be sure) to describe military history and theory, and was the first to initiate a study "of the history of wars and to deduce philosophic lessons from this history" (Poln. Sobr. Soch., Volume 32, page 79). He was the first to realize that all the principal lines along which military events develop are drawn by politics, which influences the character of a war. Politics is the cornerstone of all theory of war. But Clausewitz viewed politics in an idealistic manner, divorced from economic factors, the class struggle, from the type of social system; he reduced politics to intergovernmental relations.

The founders of Marxism-Leninism, proceeding from revolutionary materialist dialectics, offered a concrete historical, class understanding of war and demonstrated the necessity of studying each war separately. Thus the Marxist-Leninist comprehension of politics and war differs basically from the views of the idealist-dialecticians. A genuine scientific revelation of the dialectics of politics and war proceeds from the main point -- consideration of their class character.

Politics engenders war. In any case the origination of war depends on profound economic and political processes taking place within a class-antagonistic society, on the activities of the class in whose interests the war is being waged, on the correlation between social and political forces. According to Lenin, every war is inseparably linked with that political system from which it derives. Therefore in order to comprehend the essence of war it is necessary to study the politics which preceded it, of which it constitutes the result and continuation.

Politics, however, does not solely "give birth to war." it defines its objectives and influences the methods of waging war. "The character of the political aim," wrote Lenin, "possesses decisive influence on the waging of war..." (Leninskiy sbornik, XII, page 429).

Two elements presented in the Leninist definition of the essence of war -- "*continuation of politics*" and "*violent means*" -- express two inseparably linked aspects. On the one hand, the more profound, determining aspect, war is a continuation of politics, while on the other hand, a subordinate aspect -- it constitutes violence, that is continuation of politics by violent means. Consequently for the sake of completeness in revealing the essence of war it is always necessary not only to emphasize its determining, political aspect (continuation of politics) but also to indicate the form of functioning of politics, that is utilization of violent means. As a whole the dialectical unity of politics and violent means creates such a societal phenomenon as war. Without politics there is no war, just as there is no war without employment of violent means, *and armed forces in particular.*

But this is the *intrinsic expression of the term "war."* The content of the term "war" is broader, richer in substance. Marxist-Leninist science views war as a social phenomenon which under present-day conditions is waged not only by armed forces and other organizations (for example, of a paramilitary nature), but also by a people as a whole, by a nation's entire material and spiritual resources. Lenin directly emphasized that modern warfare constitutes a comprehensive test of a nation's economic and organizational resources, that victory in war is won by the side with the greater reserves, the greater sources of power, greater staying power within the masses (Poln. Sobr. Soch., Volume 39, page 237). By dint of this the content of war includes nonmilitary *political means* -- *economic, ideological, diplomatic* and others, while war itself is viewed as a *special state of society.*

But inclusion in the content of the term war of nonmilitary political means, and consequently nonmilitary forms of struggle, does not signify that they are of equal significance with armed forces and armed combat. Armed forces constitute the principal instrument of policy in war, and in

this sense armed combat is the main content of war. Nonmilitary forms of struggle are essentially for the purpose of supporting successful prosecution of the war. Lenin stated that "if things have gone to the point of war, then everything should be subordinated to the interests of the war" (Poln. Sobr. Soch., Volume 41, page 117). During the course of the war the role of all nonmilitary forms of struggle and each form separately may change, and consequently their specific weight and significance in respect to armed combat and in the war as a whole may also change. They possess a certain independence in carrying out their tasks.

Thus the Marxist-Leninist position on this question is quite clear. One cannot help noting, however, that in theoretical studies one sometimes encounters assertions which boil down to the following: nonmilitary political means are utilized in peacetime, and therefore it is wrong to include them in the content of war. One should be able clearly to see the one-sidedness of such an approach in assessment and utilization of the great diversity of political means. To reason in this manner means to reduce war to utilization of armed forces and thus to ignore the statements of Marxism-Leninism on the essence of violence as a totality of utilization of diversified forms (measures) of compulsion (economic, ideological, diplomatic, administrative, etc), and of course military as well. In the second place, armed forces as an instrument of policy also exist in peacetime. Although they are not directly utilized until a war begins, through the very fact of their existence they constitute an important means of implementation of policy between wars.

Ideological-Theoretical Foundations of Soviet Military Science

Since war is a specific historical phenomenon, a social category, a particular state of society, it will obviously be correct to state that contemporary war is investigated by many sciences -- some to a greater degree than others.

The sociopolitical aspects of war are investigated by the social sciences, and in particular by *historical materialism* and its major component in relation to the subject under discussion -- *Marxist-Leninist doctrine on war and army*.

The military aspect proper of war *in all its links and relations with its sociopolitical aspects* is also investigated by many sciences, and in particular by *military science* and a number of relatively independent military-technical sciences. It is important to emphasize at this point that this investigation is not an isolated but rather a unified process. The social sciences cannot properly examine the sociopolitical aspects of war without support of the data and conclusions of military science and without penetrating to a certain degree into an analysis of its

specifically military aspects. And military science in turn cannot successfully investigate the military aspect of war without support from the data and conclusions of the social sciences, particularly Marxist-Leninist doctrine on war and army. In addition, military science investigates precisely the military aspect of war, and particularly utilization of means of armed violence in war, in the light of the political aims and political content of war, that is it studies and investigates within its framework the intrinsic expression of war -- a continuation of politics by violent means. Thus at the level of our analysis one can conclude that war constitutes the *subject of investigation* of many sciences (to varying degrees and completeness), naturally including military science. Only by cognizing war as a social phenomenon, an exceptionally complex and diverse phenomenon, can military science properly conduct elaboration of its subject.

Thus war is the *object* of cognition by military science. At this point one can logically ask: what is the *subject* of contemporary military science? it is a well-known fact that the object of a science's cognition and its subject are not identical terms. The subject of a science is narrower than its object of cognition.

Why are the terms "object" and "subject" not identical? Why is the subject of science narrower than its object of cognition? Because in the first place the object, objective reality, is always richer, broader than acquired knowledge; the subject of a science comprises that which has already been specifically determined by experiment and has been included in the process of scientific activity. Cognition, stated Lenin, is an eternal, infinite approximation of thought to object (Poln. Sobr. Soch., Volume 29, page 177). He emphasized time and again that in cognition it is essential to strive toward a fuller and more comprehensive study of an object, and this is possible only by means of a sequential transition from the study of certain specific aspects, properties and relations to others, from cognition of certain, less profound substances to other, more profound substances. Such is the dialectic and logic of any scientific cognition of an object by means of its study via the subject of science. In the second place, the subject of military science in particular is narrower than its object of cognition also because war, as was stated above, is investigated by other sciences as well, which also have their own subject.

In contrast to the subjects of other sciences, the subject of military science expresses the main content of war, that is armed combat. Herein lies the essence of its specific features.

Thus military science comprehensively considers knowledge on war provided by various sciences, but the specific *subject of its investigation is armed combat in all its connections and relations with sociopolitical, economic and other factors of war*. Its subject also includes knowledge of armed forces. Armed combat and armed forces are examined by it through the prism of cognition of corresponding laws and patterns.²

It seems to us that such an approach to the subject of military science on the one hand does not permit its narrowing to the framework of the study of military operations, that is "pure" art of war, which constitutes an organic flaw of bourgeois military science. On the other hand it does not permit military science to enter into the functions of other sciences, that is to monopolize (to the detriment of the cause at hand) the investigation of such a complex social phenomenon as war.

From that which has been stated about the object and subject of modern Soviet military science one can conclude that it encompasses *specifically military, morale-political, military-economic and scientific-technical* (in that part connected with weapons and combat equipment) topics. Of course their investigation is based on the history of wars and the art of war in general, and wars in defense of the socialist homeland in particular.

Soviet military science is based on a rigorously scientific foundation of Marxism-Leninism and all its component parts. It finds its philosophic foundation in *dialectical and historical materialism*.

Military science, on the basis of general philosophic tenets and conclusions, cognizes such a multifaceted and complex social phenomenon as war, investigates armed combat and armed forces as an instrument of politics. The Marxist-Leninist principle of objectivity focuses theorists and practical experts in military affairs on cognition of the real processes of war, a comprehensive estimate of reality, the making of substantiated, optimal decisions, the elimination of subjectivism and voluntarism. The principle of party-mindedness orients military cadres toward unconditional defense of the interests of the worker class and all toilers, an approach to all social phenomena from the position of defense of the conquests of socialism and Communism. The thesis of philosophic materialism on the active role of man's conscious activity lies at the basis of scientific solution to the problem of the correlation between the objective laws of military science and the conscious activity of the masses and military commanders.

The laws and categories of materialist dialectics enable military science to focus its attention on the most important and substantial connections and relations in the mechanism of military affairs. Marxist-Leninist methodology serves as a compass in investigation and elaboration of military-theoretical problems advanced by practical realities.

Marxist-Leninist sociology, revealing at the level of historical materialism the most general laws of development of society, teaches us to approach and solve problems of war, proceeding from the material conditions of society, to see the relationship between the course and outcome of war and economic, political and spiritual factors. Only on the basis of historical materialism is it possible to understand the nature and

essence of wars. Marxist doctrine on war and army, developed by Lenin in the new historical era, serves as a philosophic-sociological basis of Soviet military science.

The economic doctrine of Marx and Engels, elevated by Lenin to new heights, is also inseparably linked with military science, which is explained by the objective and intimate interlink between the objects of their cognition -- economics and war. Soviet military science proceeds from the determining influence of economics on war and military affairs. The economic structure of society dictates the causes and political character of wars. Economics constitutes the material base for creating the means of warfare; the development of new means and changes in the "human military material" evoke changes in the methods and forms of combat, in army organization, methods of troop control, etc. Economic relations through politics and ideology affect the morale of the civilian population and army, and determine the capability for realization of the nation's military-economic potential to achieve victory in war.

Military economics, forming at the juncture of political economy and military science, studies the economic patterns of war and offers recommendations on the most expedient economic policies in the area of military organizational development, solution to problems of economic support of national defense and utilization of material and human resources in the interests of victorious prosecution of war.

The Leninist doctrine on imperialism thoroughly reveals the sources of unjust wars of plunder, the politics of aggression, pursued for the sake of profits for monopoly capital, and serves the cause of exposing today's American "hawks." At the same time Lenin's substantiation of the socio-economic advantages of the Soviet system over the capitalist strengthens the confidence of Soviet citizens and the men in our army and navy in the inevitability of the aggressor's defeat if he dares start a war against our homeland.

Theory of scientific communism is of particular importance -- ideological-political and methodological -- for Soviet military science and practical military affairs. Scientific communism studies the principal laws governing the socialist revolution, the building of socialism and communism in their interrelations and interdependences. One of these general laws is armed defense of the conquests of socialism against imperialist aggression.

The growing role of military science in solving contemporary problems of military affairs under conditions of a military-technical revolution of necessity dictates further elaboration of new problems of military theory, taking into consideration changes occurring in the means and methods of warfare, in the forming and optimization of operational-tactical demands on new types of combat equipment and weapons and in forecasting development

of the art of war, proceeding from the nature of wars of the present era and the prospects of scientific-technical progress.

At the same time one cannot help but see the growing role of military science also in the fact that it constitutes one of the principal sources of the shaping of military doctrine of the socialist state. Carrying out the demands of the policies of the CPSU and Soviet government, military science investigates a broad range of problems in order to provide our military doctrine with an optimized choice of possible variant solutions to military tasks facing the Soviet state. Herein lies the essence, of course in general form, of the interrelations between military science and doctrine. We should emphasize that the interaction and connections between military science and doctrine are of both an *indirect and direct nature, and within the links proper -- direct and inverse*. These connections are as follows: 1) military science-military policy-military doctrine; 2) military science-military doctrine; 3) military doctrine-military science.

Indirect connections occur along the line military science-military policy-military doctrine. Military policy, predicting the development of the world's military-political situation, takes in the latest conclusions and recommendations of military science and periodically, as needed, introduces basic refinements into the content of doctrine. Consequently in this case military science influences doctrine via military policy.

Direct connections occur in the most definite manner along the line military science-military doctrine. Here we are dealing primarily with the immediate role of military science in elaboration of the military aspect proper of doctrine, as well as in development of the scientific principles of already adopted points of military doctrine in the course of the practical activities of the political, military leaders and all military cadres in preparing the armed forces and the nation for war.

Feedback connections are naturally of prevailing significance along the line military doctrine-military science, that is when military doctrine assigns military science new tasks pertaining to the future elaboration of military problems.

All the above-mentioned links are fully coordinated and reconciled with the points of materialist dialectics on the diversity of processes of interaction and interpenetration of politics, military doctrine and science; the character and functions of the latter are more deeply revealed in an investigation of these links.

Military science exerts corresponding influence on the elaboration of fundamental directions of military-technical policy; it proceeds thereby from overall national technical policy and the capabilities of the economy.

Military-technical policy constitutes an aggregate of planned and in-process measures pertaining to the development and manufacture of the instruments of war, needed to supply the armed forces in conformity with state military policy and military doctrine. Our state's military-technical policy is inseparable from its economic and military policy. Its scientific, economic substantiation includes, for example, the following items: 1) harmonious development of equipment and supply of all branches and arms; 2) optimization of the ratio between the various services and combat equipment within the different services and arms; 3) determination of the material requirements of armed forces military-technical development, and increase in the effectiveness of expenditures for military equipment on the basis of scientific and technological advances.

Guided by CPSU policy, our military-technical policy has the task of ensuring superiority over the aggressive forces of imperialism in the hardware of war. We possess a realistic economic basis for this: the economic system of socialism, based on public ownership of the means of production, its root advantages over capitalism, the planned nature of social production, and its subordination to national interest. All this unites economic and military problems into a single whole. The principles of indivisibility of these problems is characteristic of all economic-political activity of the CPSU and Soviet government.

The scientific, economic substantiation of our military-technical policy is an organic part of the system of centralized planned direction of the socialist economy. Herein is realized a most important advantage of socialism over capitalism -- planned development of military-economic and scientific-technical potential, serving as a foundation for the scientific strength and effectiveness of our military science.

These are the general features of the substance of the matters discussed in the article.

FOOTNOTES

1. Voyennaya Mysl', No 11, 1970.
2. The editors plan to present a separate discussion of the laws and structure of military science in subsequent issues of this journal.

MILITARY STRATEGY AND ECONOMICS

Col Gen M. Povaliy

Marxist-Leninist science, which studies the development of society from the standpoint of dialectical and historical materialism, discovered and substantiated the true nature of political and economic relations of classes and nations, and the essence of war as a continuation of politics by other, violent means. The founders of scientific Communism established that the level of an economy's development is decisive in the development of society. They also emphasized the decisive role of the economy in war. "...In every war," wrote V. I. Lenin, "the economy is determining" (Poln. Sobr. Soch. [Complete Works], Volume 34, page 41).

It is quite natural that the mutual influence of strategy and economics constitutes one of the root problems of military theory and practice. Strategy as the most important area in the art of war is complex and many-faceted. The article "Politics and Military Strategy"¹ discussed several problems handled by strategy during war, its subordination to politics, the relationship between the success of strategy and the social system, and the nature of national policy. In this article we shall examine the most important aspects of the problem of mutual influence and interaction between strategy and economics with the leading role of politics in the period of preparing for war.

The subject of strategy includes the theory and practice of comprehensive preparation of armed forces for war and methods of conduct of warfare with maximum effective utilization of all resources to achieve victory over an aggressor.

For a deeper understanding of the content of strategy it is essential to examine the interrelations between strategy and economics, guided by the major tenets of Marxism-Leninism, which states that victory in war "is based on the production of arms, and the production of arms in turn is based on production in general, ...on 'economic power', on 'economic position', on the *material* means at the disposal of the agents of coercion" (F. Engel's: Izbrannyye voyennyye proizvedeniya [Selected Military Writings], Voenizdat, 1957, page 11). Every important military task deals with problems not only of a strategic but also of a political, economic, technical, moral, and scientific character (taken as a whole). Therefore strategy, which studies the capability of the potential enemies, one's own and allied nations, is guided not only by the tenets of military science but also by the instructions of top-level political and governmental entities. In addition, it utilizes the conclusions and recommendations of various scientific bodies.

Strategy focuses particular attention on a study of the composition and groupings of the most aggressive imperialist coalitions, their open and concealed supporters and adversaries. It estimates the state of their economic and political organization, the level of development of their armed forces, the character of military-economic measures being implemented, and the degree of militarization of the economy. On the basis of this type of data, strategy can draw conclusions on measures necessary to prepare to repulse aggression, on the character, scale, and methods of conduct of potential wars and the conditions producing them.

Proceeding from an analysis of the policies of imperialist states and their economic capabilities, politics and strategy, taking into account the economic capabilities of one's own country, resolve the question of the degree to which and the period in which it is necessary to strengthen military potential, which is expressed normally by numbers of combat troops, logistic support, quantities of conventional and nuclear weapons and means of delivery, as well as the state of military production. In settling the question of development of military potential one takes into consideration the state of the economy, its mobilization potential, and the geographic distribution of industrial installations.

Strategy establishes the organizational forms of units, large units, formations, all branches of the armed forces, quantity and sophistication of equipment, and logistics; it supervises troop combat training applicable to the military-technical and strategic features of the anticipated aggression.

Solving root problems of preparing a country's defense, strategy is guided by Lenin's statement that "intensified preparations for a serious war demand ... a protracted, intense, persisting and disciplined effort on a mass scale" (Poln. Sobr. Soch., Volume 36, page 325). He further emphasizes: "...We demand of all a serious attitude toward national defense. A serious attitude toward national defense means thorough preparation and strict consideration of the balance of power and correlation of forces" (page 292). One should not underestimate the opponent -- "this is the most dangerous thing" in war (V. I. Lenin: Poln. Sobr. Soch., Volume 41, page 144).

The modern development of science, technology, and the economy makes it possible rapidly to improve all types of weapons. The imperialist nations, and the United States in particular, are spending funds lavishly on major efforts in this area. The effort is particularly intensive in the area of study of the possibilities of use of lasers and further sophistication of nuclear and thermonuclear warheads.

Multiple warheads are being developed with scatter of the individual nuclear warheads for penetration of an ABM system and more reliable hit probability on area targets, particularly industrial centers. Tests are being conducted on multiple warheads containing guidance systems ensuring greater accuracy and higher hit probability on particularly "hard" point targets, such as silo-type missile launch sites. Devices are being designed for submarine search and for more effective warhead penetration of ABM systems. ABM and ASW complexes, space and missile weapons are being developed. The Pentagon is building increasingly powerful strategic missile complexes with improved protection of silo-type launch sites. The submarine strategic nuclear-warhead missile system is being further improved, with more powerful missiles, with MIRV warheads, as well as increased range of fire; low-noise and no-noise nuclear submarines are being designed.

New strategic and tactical aircraft are being developed, with improved performance and more sophisticated navigation equipment, missile armament, and electronic devices for air defense system penetration. Advanced models of tanks, APCs, helicopters, artillery, missiles and other weapons are being developed.

One can conclude from the above that a war, if the aggressors initiate one, will be waged with complex, diversified weapons and will be characterized by a high degree of intensity not only of combat operations. It will require a high degree of intensity of effort on the home front as well, **tough** competition on the part of the economies of the belligerent nations.

Naturally our country and all nations of the socialist commonwealth cannot help but take into consideration all the preparations being made by American imperialism for the initiation of another world war. The Soviet Union is doing everything it must in the interests of preserving peace and security of peoples.

As a rule the tasks of strategy in regard to repulsing aggression are specified on the basis of prediction, the complexity of which lies in the fact that one is sometimes dealing with scattered, incomplete, and in many instances contradictory data, since in preparing for war the aggressor carefully conceals his war plans and intentions and endeavors to launch a sneak attack, employing maximum force at the first strike. The problem of organizing the nation's defense becomes extremely complex in connection with this; this applies in particular to determination of the composition of requisite manpower and equipment, material and other resources.

In his Voprosy sovremennoy strategii (Problems of Modern Strategy), Mar SU M. N. Tukhachevskiy wrote: "We can predict, forecast the forms of a future war only for its initial period, on the basis of the character of development of armed forces, preparation and militarization of the industry of those nations entering the war."² Marshal Tukhachevskiy substantiated this statement by the impossibility of estimating and predicting the character of a war as a whole, from beginning to end, in view of the fact that past wars have broken down, on the basis of the nature of combat operations, into a number of stages, differing from one another by the employed composition of forces, quantity and sophistication of weapons and equipment, tactical, major tactical and strategic actions. Indeed, not only World War I but World War II as well, including its most decisive segment -- the Great Patriotic War -- was made up of periods, the distinction of which was determined by economic, political, strategic, military-technical and other conditions.

The task of strategy under present-day conditions apparently consists in correctly estimating the overall picture of a potential world war, determining the theaters of military operations and the significance of each, determining the methods of warfare, as well as the material requirements of the armies in the field, which serve as a basis for a country's economic preparations for war. In these preparations one takes into consideration the fact that in a modern war the economy functions on the one hand as a source for strengthening the offensive might and firepower of the armed forces, that is as a source of logistical support for the army and navy, and on the other -- as an objective of military influence with the aim of weakening the opponent's economic potential.

Strategy, proceeding from the points of military policy, takes part in solving major problems connected with increasing a country's economic potential, guided by fundamental conclusions drawn on the basis of experience in preparing for and waging world wars. This experience indicates that not only defense plants take part in supporting the armed forces but almost all branches of civilian industry as well. Success in modern operations is directly dependent on the transportation network, its condition and the operation of all modes of transport. Therefore transport and its development are constantly in the center of attention of strategy, since "arms, composition, organization, tactics and strategy depend first and foremost on the level of production achieved at a given moment and on means of transportation" (F. Engel's: Izbrannyye voyennyye proizvedeniya, page 11). Also of considerable importance for strategy is the financing of military measures.

What are the interrelations between strategy and economics on the fundamental problems of economic preparation of a country for war?

First of all their interaction is seen in resolving problems of *armed forces organizational development*. As is well known, it is carried out on the basis of the tenets of military doctrine, scientific and technological achievements, state of production, state of all branches of the economy and future prospects for economic development as a whole. Politics and strategy are guided by Lenin's statements that "without science it is impossible to build a modern army" (Poln. Sobr. Soch., Volume 40, page 183) and that in war "victory is won by the side with the superior technology, organization, discipline and the best hardware; war has taught us this... This must be learned, because without machinery, without discipline it is impossible to live in a modern society -- one must either master advanced technology or be crushed" (Poln. Sobr. Soch., Volume 36, page 116).

The Soviet state, utilizing the advantages of the socialist economic system, created powerful armed forces and is constantly improving their organization, the balance between the branches and arms, their equipment, as well as combat, political and routine training.

A multimillion-man army is necessary for waging modern warfare. But it is impossible to maintain such armed forces in peacetime. Therefore in all nations without exception armed forces consist of a specific contingent of peacetime troops, as a rule well-equipped and trained, at a high level of combat readiness, as well as troops prepared for mobilization deployment on the basis of universal military obligation.

Toward the beginning of and in the course of a war the economy must supply the needs of the armed forces, satisfying their enormous and increasing demand for military equipment, ammunition, fuel, clothing, provisions, various gear, repair facilities and many other types of support services.

Strategy in turn, in order to achieve maximum economical and effective utilization of military equipment, particularly costly and complex-manufacture weapons, guides the research efforts of appropriate military scientific establishments.

With the aid of science, technology and industrial production, strategy also resolves such an important problem in armed forces organizational development as improvement in military hardware; it determines the requisite quantity and types of existing and development-stage arms for each branch, service and arm; it accelerates the process of becoming operational for all new and improved models of combat, transport and other types of military equipment; together with the economy it endeavors to ensure that the latest scientific and technological advances are put into production in order to build the most advanced and powerful weapons.

In connection with increased aggressiveness on the part of imperialism, Soviet military strategic thought, science and economic system have provided for the development of strategic nuclear forces which in the hands of policy constitute a decisive means of preventing war and ensuring the security of the nations of the socialist commonwealth. L. I. Brezhnev, General Secretary of the Central Committee CPSU, has highly praised the role of the strategic nuclear forces and has defined important missions in the area of the state's military policy. "We have created strategic forces," said Brezhnev, "which constitute a reliable means of restraining any aggressor. We shall respond to any and all attempts from any quarter to secure military superiority over the USSR with a corresponding increase in military strength, guaranteeing our defense. We cannot do otherwise."³

One can very clearly see the interrelationship between economics and strategy in development of *rail and highway network and modes of transportation*, which play an important role in the conduct of military operations. In the world wars the great extent of the fronts and the distance between the troops and the bases supplying them required a vast network of lines of communication of all types -- land and water -- for the prompt hauling of troops and supplies.

The problem of transport is an important one today as well. Strategy determines the scope of requisite mobilization, operational and supply traffic, estimates the capability of all modes of transport and, jointly with the economy, specifies the execution of appropriate measures for peacetime and war, proceeding from the assumed character of a future war. Strategy takes into account the advantages and disadvantages of each mode of transport for a given theater of operations and plans together with the economy development of lines of communication and manufacture of transport means. Strategy, for example, is interested in the manufacture of large-capacity trucks with off-road capability, in the manufacture of transport helicopters and fixed-wing aircraft, fast river vessels, etc.

Taking into account enemy intentions of disrupting transportation, strategy and economics also coordinate the matter of defense of all lines of communication, particularly junctions, transshipment points, as well as matters pertaining to repair of highways, rail lines, river-crossing structures and various other structures ensuring organization of rapid movement of passengers and goods. Strategy is also interested in securing *redundant* transport facilities not only in theaters of military operations but also between industrial regions and forces operating in a theater of military operations and on home territory.

Planned distribution of manpower resources is an extremely complex matter pertaining to armed forces organizational development and the operation of the economy (particularly at the beginning of a war). As demonstrated by the experience of World War II, all branches of the economy required from 4 to 5 times as much manpower as was in the armed forces in order to supply war needs. In a future war, in addition to ensuring the normal operation of industry, transportation and agriculture, considerable manpower will be required for repair and rebuilding operations and for civil defense efforts. Therefore problems of drawing up a wartime manpower balance sheet should definitely be resolved jointly by strategy and the economy.

Strategy establishes the principles of supplying the armed forces with personnel and of setting up a system of military cadre training. The system of combat, technical, political, and special troop training is constantly improved, as is tactical and strategy training of higher headquarters personnel and military cadres in regard to changing military equipment adopted by the armed forces for conducting combat operations. Friedrich Engels noted that the influence "of military commanders... was limited to adapting method of warfare to new weapons and new soldiers," while Lenin stressed that equipment exerts decisive influence on combat training methods, methods of warfare and strategic operations. "Military tactics depend on the level of military technology -- Engels masticated this truth and placed it into the Marxists' mouths" (Poln. Sobr. Soch., Volume 13, page 374).

Lenin spoke of the enormous role played by the aware soldier and sailor, who possessed initiative, in achieving victory in modern war. The enlisted men, NCOs and officers of the Soviet Army and Navy are indoctrinated in the ideas of Marxism-Leninism and proletarian internationalism, possess excellent technical training and morale-fighting qualities. Our armed forces are directed by the best of the experienced Communists, who have proven capable of organizing personnel training and handling agitation, propaganda and indoctrinational effort in the army and navy at the requisite level.

In view of the complexity of the manufacture of modern weapons, the adoption of automatic control in industry and transportation, and the development of mechanization in agriculture, the economy requires highly-skilled workers, technicians, and engineers. Consequently, strategy and economics are equally interested in complete and prompt supply of manpower resources both to the armed forces and the economy.

For planning training and distribution of manpower during the period of the Great Patriotic War, a special manpower committee was set up under the Council of People's Commissars. The optimal variant of

utilization of all manpower resources in war can be established only with a careful examination of the manpower needs of the armed forces and each branch of the economy.

Ties between economics and strategy are also revealed in matters of *financing military expenditures in peacetime and in war*, determination of state expenditures for maintaining armed forces and for conducting a complex of military-economic measures to support their combat activities. Of course all these matters are settled in the light of the fundamental points and requirements of policy.

Strategy defines the volume and product mix for military consumption covering the immediate future, which also determines expansion of military production, the aim of which is to provide combat equipment and supplies to large units and units, to create reserves of weapons, ammunition and other military supplies needed by armed forces when war begins. This can be used as a basis in determining the volume of military expenditures in the state budget.

A decisive role in determining volume of military expenditures is played by policy. It estimates the international situation, defines the military-political aims and tasks of strategy, and also assigns targets to the economy.

Of primary importance to Soviet policy in peacetime are tasks pertaining to steady growth of the country's productive resources and improvement in toiler living standards. These tasks are resolved on the basis of the socialist economic system. In a complex international situation, with a threat of military aggression presented by imperialism, "substantial funds must be spent on defense," stated L. I. Brezhnev, General Secretary of the Central Committee CPSU. "And I can assure you that we shall maintain defense at the very highest level. Our Armed Forces are reliably defending the boundaries of our homeland and are standing guard together with the allied armies over the conquests of the brother socialist nations..."⁴

In the imperialist countries direct and concealed military expenditures have assumed fantastic proportions, and war preparations are being conducted on a broad scale. Hidden expenditures are being made through the budget appropriations of nonmilitary departments and agencies, for the purpose of deceiving the people. The giant military-industrial complex is exerting enormous influence on governmental policy, is receiving large appropriations and is obtaining high profits in the area of military production. "The imperialist governments are drawing up new plans for armament growth extending entire decades into the future..."⁵

Military budgets provide for expenditures for the maintenance of personnel, acquisition and operation of military equipment, and capital construction. For further growth in military potential, vast sums are allocated for the purchase of combat equipment, weapons, ammunition, transportation, communications, fuels, and a great variety of military supplies necessary for mobilization deployment of the army and navy. Large sums of money are allocated for scientific research and experimental projects for the purpose of developing new and advanced weapons. The construction of new military plants or the expansion of existing facilities is financed.

This type of development is going on in the United States and the FRG, where military potential is growing rapidly. The specific share of military expenditures in the overall budget of these countries, in connection with the arms race and militarization of the economy, has reached a fantastic level. "Militarization of the economy is inseparably linked with the general aggressive policy course of the imperialist powers, and the United States in particular."⁶ For example, out of a total U.S. federal budget of 135 billion dollars for 1968, expenditures for the Defense Department alone totaled 78 billion dollars, that is more than 56 percent of total allocations. Counting expenditures for the AEC (Atomic Energy Commission), NASA and foreign "aid," actual U.S. military expenditures reached a level of 85 percent of total federal budget expenditures.⁷

Judging from the 1971 budget, the percentage of military expenditures is continuing to grow.

Military appropriations in the FRG almost doubled from 1960 to 1967 -- from 10.0 to 19.7 billion marks.

Under present-day conditions the cost of even so-called conventional weapons in the imperialist countries has multiplied dozens of times over. The increase in expenditures for a war economy also is connected with the fact that in addition to conventional military hardware, production includes nuclear warheads and delivery vehicles, automatic control gear, electronic and other complex and costly equipment. The lion's share of military expenditures goes for the purchase and maintenance of a great variety of expensive military equipment. All this has altered the structure of the military budget. In 1968 and 1969 the United States budgeted military appropriations of 78 billion dollars each of these years, 28.4-30.4 percent of which was for maintaining personnel, 26.6-28.4 percent for operation and maintenance of equipment, 30.1-31.3 percent for the purchase of military hardware, and 9.8-10.0 percent for research and development.

Of the 21-23 billion dollars budgeted for the purchase of military hardware in 1969, it was planned to spend 38 percent for aircraft and aircraft parts, 11.5 percent on missiles, 29 percent on armor equipment, artillery weapons, small arms and ammunition, 7.2 percent on warships, and 6 percent on electronic equipment (figures rounded off).⁸

In the FRG expenditures for combat equipment and weapons in the period 1960-1964 averaged 70-71 percent,⁹ while in Japan 40 percent of 2340 billion yen allocated for armed forces development in the Third Five-Year Program was for the purchase of advanced equipment.¹⁰ A characteristic feature of scientific and technological progress is an extraordinarily broad scope and high rate of research and development, in which military topics occupy an important position. This is connected with the fact that imperialism has become more aggressive and adventuristic. "Militarism has always been an inseparable feature of imperialism," stated L. I. Brezhnev, General Secretary of the Central Committee CPSU, "but today it has assumed an unprecedented scale."¹¹

U.S. federal expenditures for research and development projects in 1969 were planned at approximately 18 billion dollars, with 8.1 billion for the Department of Defense (46 percent), and 4.5 billion for NASA (25 percent). The fact is that approximately 70 percent of all expenditures are military in nature (not counting AEC appropriations). Within the Department of Defense, appropriations were distributed among the services as follows: approximately 50 percent to the Air Force, 27.3 percent to the Navy, and 21.2 percent to the Army, while the structure of expenditures broke down by types of equipment as follows: missile hardware -- 31.7 percent, aircraft equipment -- 12.8 percent, space exploration -- 16.2 percent, basic research -- 8.2 percent, warships -- 5.2 percent.¹²

At the same time the production of new weapons is accelerating, with the participation of the big monopolies in almost all branches of industry. According to reports in the American press, the U.S. government made a preliminary decision to increase military appropriations for the 1971/72 fiscal year by 3.7 billion dollars over the preceding year. The Washington Post reports that the bulk of additional appropriations will be spent on perfecting new weapons.¹³

Other imperialist countries of interest are the FRG and Japan, which are utilized by the United States as forward bridgeheads for aggression against the USSR and the nations of the socialist commonwealth. FRG monopoly capitalism is endeavoring to keep pace with the nuclear powers in the development of missile-nuclear and conventional weapons. The FRG's biggest monopoly -- the Federal Union of German Industry -- is playing a major role in militarization. At the present time approximately 50 scientific research organizations in the FRG are working on rocket and missile design, while approximately 20 firms are prospecting for and mining

uranium in various countries. In 10 years of intensive Bundeswehr growth (1956-1965), military consumption has increased 2.6-fold. The sharp increase in arms production has been based primarily on aircraft and missiles.

Japan receives assistance from the United States in development of its atomic industry, as it does in other branches of the economy which are of military significance. The achieved level of sophistication of the atomic industry makes it possible to perform tasks connected not only with the production of atomic energy for peaceful purposes,¹⁴ but also tasks connected with building nuclear weapons. The newspaper Yomiuri published in mid-1966 figures on Japan's industrial capability: "The Japanese nuclear weapons manufacture program will not require major additional capital investment... The atomic plant can easily be converted to produce nuclear weapons. As for missile production, in this respect Japan is ahead of the PRC... It will require not more than 12-15 months for Japan to be able to begin producing nuclear weapons... But the main difficulty," the newspaper emphasizes, "lies in the resistance of leftist elements."¹⁵ In Japan, just as in the FRG, the move in the direction of manufacture of missiles and nuclear weapons is not supported by the broad toiler masses and therefore is carefully concealed from them.

It follows from the above that capital investment for research and development projects dealing with improving military equipment in the imperialist countries is steadily growing. Therefore, in the interests of defense against the aggressor, the socialist nations are also compelled to conduct similar projects, in order not to give imperialism the opportunity to gain strategic and economic advantages which it would unfailingly utilize to unleash war. We cannot forget Lenin's statement that "the behavior of that army which is not preparing and training to master all types of weapons, all means and methods of combat which the enemy has or may acquire, is foolish or even criminal" (Poln. Sobr. Soch., Volume 41, page 81).

Preparing the nation for defense demands the planning of measures which ensure *a fast and organized shift of the armed forces and the economy from a peacetime to a war footing*. This process will be considerably more complicated in the missile-nuclear age. Estimating its role in forming the productive revolutionary energy of the toiler masses on the battle front and on the home front, Lenin stated that "victory in war will be won by he who has greater reserves, greater sources of strength, and greater stamina within the masses" (Poln. Sobr. Soch., Volume 39, page 237). The experience of the last wars has confirmed this.

The modern history of wars knows of several conditions and methods of mobilization deployment of mass armies and their engagement in war. The battles of World War I were preceded by almost simultaneous mobilization of the armed forces of the belligerents, their concentration and

deployment along the frontiers. Combat operations began under approximately equal conditions. The general staffs, on the basis of experience inherited from past wars, were counting on bringing the war to a swift completion, relying on mobilization supplies of weapons, ammunition, and clothing, plus the current output of war plants. But they had badly miscalculated. The war demanded a shifting of almost the entire economy to supplying the needs of war. In 1918 war production comprised 75 percent of total industrial output in Germany and France, 65 percent in England, and 40 percent in the United States. Military orders for all these rations amounted to 90 percent in the metallurgical industry, and 75-80 percent in heavy industry.¹⁶

In World War II the process of shifting of armed forces and economy to a war footing occurred under other, more complex and critical conditions, particularly for those nations which were the victims of sneak aggression. Nazi Germany mobilized its army sequentially, over a period of 5-7 years. Every campaign waged in Western Europe was preceded by preliminary mobilization deployment, with utilization of the military, raw material and industrial resources of the occupied nations. Attacking its victims, Germany would put superior numbers into battle, figuring on disrupting mobilization of the armed forces and economy with a single sneak attack, destroying morale and inflicting a decisive military defeat before their economy could affect the course of military operations.

An important role is played by the economy in shifting armed forces from a peacetime to a war footing. Lenin taught that in struggle against aggressive imperialist states a peace-loving country can count on success only if it can quickly mobilize its armed forces and the entire economy to meet the requirements of war. "...If things have developed to the point of war, then everything should be subordinated to the interests of war; all domestic activities should be subordinated to war" (Poln. Sobr. Soch., Volume 41, page 117).

The role of the economy is also important in *readying the territories of future theaters of military operations*. The actions of the NATO nations are extremely typical in this respect. In Western Europe new air and naval bases are being built and existing ones renovated, air defense and communications systems are being constructed, lines of communication are being expanded, control centers are being built (frequently under ground), as well as arms, fuel and supply dumps, according to plans of the NATO command. The Warsaw Pact nations, united by a solidarity of political aims, naturally must respond to these preparations for aggression.

Defense of industrial plants against hostile attack from the air, land and sea is a matter of great importance in economic preparations.

Economic preparation of a country for war, that is its preparation to accomplish the missions advanced by strategy and the war plan, encompasses a broad range of large and complex problems. As the experience of the war has shown, advanced determination of the comprehensive needs of the armed forces and creation of conditions for their full satisfaction should become one of the principal general tasks of strategy and the economy during the period of readying a nation for defense. Strategy determines the volume of combat equipment, weapons, transport, ammunition and other supplies needed by the armed forces to accomplish strategic missions. This is necessary in order in peacetime to estimate the degree to which the economy is capable of meeting these demands, to plan and prepare for in advance expanded reproduction of weapons, in order to prevent any gap from forming between the needs of the armed forces and the capability of the economy. This will depend not only on the production capacity of the engineering industry, the metallurgical, chemical and other branches of industry, but also on the availability of the requisite raw materials base.

An analysis of the needs of the armed forces and the capabilities of the economy is essential in order to prevent a gap from forming between the arms production potential of one's own economy and that of the enemy. Today there is no need to demonstrate the necessity of economic preparations for war. These words were uttered by Mar SU B. M. Shaposhnikov. This point acquires even more significance in the age of missiles and nuclear weapons.

Soviet military science, guided by Marxist-Leninist doctrine, proceeds from the position that the wars of the present era are characterized by a vast spatial scope, great duration and intensity of combat operations, accompanied by substantial devastation and losses in manpower and equipment. Military science also proceeds from the standpoint that in order to provide for the needs of war a high level of economic potential is required, as well as full mobilization of a nation's entire productive forces and resources, their most expedient and economical utilization for the comprehensive support of combat operations. In the socialist countries, where private ownership of the means of production and man's exploitation of man have been eliminated, and where the economy is run on a planned, scientific basis, the process of mobilization of resources, reorganization of the economy to a war footing, and continuous, steady growth of military production during the course of war are effected faster and more fully. Continuous increase in the qualitative and quantitative superiority in primary types of military equipment in reasonable ratios constitutes the continuous concern of strategy and economics.

In 1917 Lenin wrote that "in today's war... economic organization is of decisive significance" (Poln. Sobr. Soch., Volume 34, page 194) and that "the defense capability of the country which has overthrown the yoke of

capital, has turned the land over to the peasants and has placed the banks and factories under worker control, would be *many times* greater than the defense capability of a capitalist country." These Leninist theses have been entirely confirmed.

As was demonstrated by the Great Patriotic War, our economy, possessing less initial resources (steel, coal, etc), was able to surpass the enemy substantially in scale of military production and in quality of military hardware. "Our plants supplied the Soviet Army with weapons with the aid of which we were able to crush the war machine of Nazi fascism, which was supported by the industrial might of almost all Europe."¹⁷

The present-day development of the socialist economy, particularly metallurgy, power engineering, machine building, and collective agriculture, as well as successful accomplishment of the task of building the technological base for Communism, other economic and social measures conducted in this country serve as a reliable guarantee in the matter of defending our homeland and all nations of the socialist commonwealth against encroachments by aggressors.

FOOTNOTES

1. Voyennaya Mysl', No 7, 1970.
2. M. N. Tukhachevskiy: Izbrannyye proizvedeniya (Selected Writings), Volume 1, Voenizdat, 1964, page 252.
3. L. I. Brezhnev: Leninskim kursom (Leninist Course), Volume 2, Politizdat, 1970, page 541.
4. Ibid., pp 407-408.
5. Ibid., page 371.
6. Materialy XXIII s"yezda KPSS (Proceedings of the 23rd CPSU Congress), Politizdat, 1966, page 11.
7. R. A. Faramazyan: SShA: militarizm i ekonomika (The USA: Militarism and the Economy), Izd-vo Mysl', 1970, pp 37-38.
8. Ibid., pp 112-116, 122-123.
9. M. I. Bulgakov: Voyennoye potrebleniye i kapitalisticheskoye vosproizvodstvo (Military Consumption and Capitalist Reproduction), Izd-vo Mysl', 1969, pp 256, 269.

10. I. Sergiyenko: Vozrozhdeniye militarizma v Yaponii (The Rebirth of Militarism in Japan), Voenizdat, 1968, pp 117-118.
11. Brezhnev, op. cit., page 371.
12. Faramazyan, op. cit., pp 133-134.
13. Pravda, 11 January 1970.
14. Sergiyenko, op. cit., pp 94-96.
15. Quoted from A. P. Markov: Yaponiya: kurs na vooruzheniye (Japan Strikes a Course Toward Rearmament), Izd-vo Mezhdunarodnyye otnosheniya, 1970, page 87.
16. P. A. Belov: Voprosy ekonomiki v sovremennoy voyne (Problems of Economics in Modern Warfare), Voenizdat, 1951, page 113.
17. Brezhnev, op. cit., page 90.

METHODS OF DETERMINING ROAD NETWORK REQUIREMENTS OF TROOPS
DURING AN OFFENSIVE OPERATION

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The offensive operations of modern ground forces are characterized by resoluteness of objectives and a substantial increase in spatial scope. The development of nuclear missile weapons has produced profound changes in the content and character of combat operations, with a sharp increase in the role of troop mobility and consequently their need for routes of movement.

Experience indicates, however, that determination of what the road network should be in the operations area of units and large units in an offensive operation is not the simple task it might appear to be at first glance. It is not surprising that these matters have been discussed time and again in the press.¹ Unfortunately the conclusions which have been drawn are frequently contradictory, and in some cases doubtful. This is due primarily to the fact that in determining troop road requirements one at times fails to take into consideration many factors which under certain conditions are of great importance. For example, in computing the requisite number of routes, the basic criterion is normally the number of combat and transport vehicles in units (large units) which must operate within the zone of advance, as well as distance between routes, selected in order to avoid a hit on two columns advancing on parallel routes. At the same time one insufficiently considers and sometimes totally ignores such factors as the character of movement on maneuver routes, the traffic capacity of roads and change in capacity as a result of restriction of road utilization time under conditions not only of intensive hostile air reconnaissance but also hostile activity directed against en-route columns.

This gives us reason to believe that the matter of road network support in modern warfare merits more careful attention and demands special methods making it possible quickly to determine troop road requirements, taking into account all basic factors influencing both the number of routes and organization of route preparation.

In our opinion conditions which determine requisite road network density in a zone of advance can be subdivided into two basic groups -- operational-tactical and technical.

Operational-tactical conditions include those which are determined by the size of the force and nature of operations in the zone of advance, by the scope of destruction and contamination, by specific actions taken by the adversary, and by the necessity and possibility of securing the passage

of a specified number of columns as regards time and axis. Technical conditions are determined by intensity of movement, availability and traffic capacity of roads, volume of requisite route repairs and engineer troop capabilities to perform such repairs. In order to prevent errors in preparing routes required by troops for the conduct of combat operations, an entire aggregate of requirements must be taken into account.

It is well known that a road network prepared for offensive operations includes cross-country routes, maneuver and basic military roads. The nature of movement on these roads and duration of utilization will vary during the course of an offensive operation. For example, cross-country routes are usually designated for the advance of attack echelon battalions, as well as for deployment into approach march and combat formations. Therefore the utilization time for these roads is as a rule quite limited. The number of these routes increases sharply when support echelons and reserves are engaged, while the number is reduced when troops reform into march columns.

Maneuver roads are designated primarily for the movement of attack and support echelons of advancing units and large units, attached and supporting artillery, the movement of supplies and to some extent for evacuation of the sick and wounded. Traffic on maneuver roads will be characterized by a specific directional emphasis. Experience indicates that 85-90 percent of all movements on these roads involve maneuver and movement of troops toward the front, while only 10-15 percent involve the movement of supplies and evacuation. Consequently the principal direction of movement on these roads will be toward the front. Therefore these routes can be set up solely for one-way traffic. Proceeding from the possible rate of advance, the time during which these roads will be occupied by subunits ranges from several hours to 24 hours, while the traffic load will be at a maximum when the support echelon (reserve) is being engaged; as a rule the support echelon advances in route formation and at a rapid rate.

Organization of traffic on basic military roads is distinguished by the fact that in addition to troop maneuver and movement, these roads are used for bringing up supplies from mobile bases, evacuation of sick and wounded, as well as of damaged equipment. The flow of return vehicular traffic on these roads may reach 25-30 percent of total traffic, while these roads may be utilized for several days. In order to provide for return traffic, basic military roads are set up for two-way traffic (width of travelled way 6.5-7 m), or separate routes are specified for return-flow traffic.

We shall examine the relationship between troop route requirements and road capacity. Road capacity is customarily defined as that number of combat and transport vehicles which can pass over a particular road segment per unit of time with continuous movement. In general form it is defined by the formula

$$N = \frac{V_{av} \cdot 1000}{l_d + l_o},$$

where N -- number of vehicles passing per hour; V_{av} -- average speed, km/h; l_d -- vehicle distance, in meters; l_o -- vehicle length, in meters.

It would be more correct to call this quantity (N) the technical road capacity, since in a given instance it will be determined by road condition, distances between vehicles, and vehicle speed. But this formula fails to take into account the specific structure of march columns and actual column gaps. And yet road capacity will change in relation to these factors.

Therefore the military press² has directed attention to this, and the suggestion has been made to introduce the term operational-tactical road capacity [operativno-takticheskaya propusknaya sposobnost' avtomobil'nykh dorog], defining this term as the maximum number of combat (transport) units in troop columns which can pass over a particular section of road per unit of time with continuous movement. Experience indicates that the adoption of such a term is entirely justified, since this will substantially simplify calculations to determine road capacity and troop road requirements.

At the present time column gaps or distances between units and subunits are considered in determining road capacity, considering vehicle flow continuous, which inevitably leads to rather complex and inconvenient mathematical computations. In order to achieve simplification we suggest that one take into account change in road capacity depending on column gaps with a factor which we can call the column en-route dispersion factor [koeffitsiyent ucheta rassredotocheniya kolonn na marshe] (K_m). Its value is derived from the ratio of total column length (L_c) to the length of the same column minus column gaps (Σl). If we assume that gaps between units and subunits equal 5 km, while distances between vehicles are 25-50 m, column length can be expressed as follows:

$$L_c = (l_d + l_o)n + 5000(m-1),$$

where n -- number of vehicles in column; m -- number of subunits in column.

But if we consider that with the movement of several battalion columns along a route the following battalion can initiate movement behind the preceding column only when there is a gap of 5 km, the computed column length must be increased by one such gap. The formula will then appear as follows:

$$L_c = (l_d + l_o)n + 5000 \text{ m.}$$

Figure 1 contains a computation diagram, conclusion and graph value of a column en-route dispersion factor (K_m) in relation to vehicle distances.

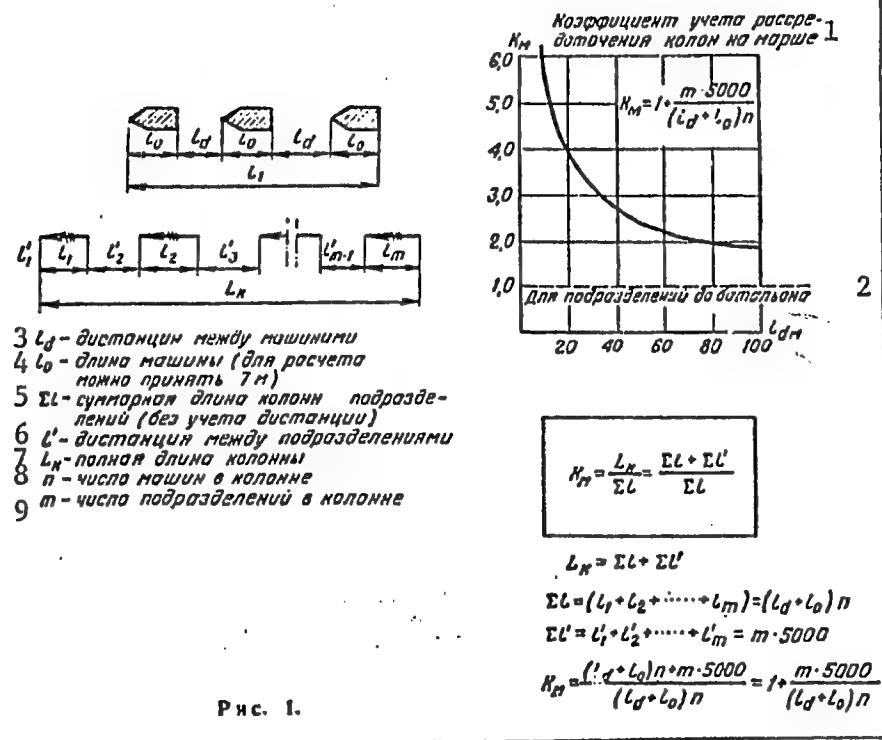


Рис. 1.

Figure 1.

Key to figure: 1 -- column en-route dispersion factor; 2 -- for subunits up to battalion; 3 -- vehicle distance; 4 -- vehicle length (7 meters used for purposes of computation); 5 -- total length of subunit columns (excluding gap); 6 -- gap between subunits; 7 -- total column length; 8 -- number of vehicles in column; 9 -- number of subunits in column

Analyzing the relationship obtained, we see that for subunits (up to and including battalion) the column en-route dispersion factor is equal to 1. For larger units the factor varies with vehicle distance and number of subunits in the column. With an increase in vehicle distance its absolute value will diminish, while it will increase with an increase in number of subunits. For the distances we have used (vehicle distance 25-50 m) the value of the factor will range between 2.5 and 3.1 ($l_d=25$, $K_m=3.1$; $l_d=50$, $K_m=2.5$).

If the column en-route dispersion factor is introduced into the road capacity formula, the latter will assume the following form:

$$N = \frac{V_{av} \cdot 1000}{(l_d + l_o) K_m}$$

Using various coefficient values, one can establish the character of change in operational-tactical road capacity in relation to average speed, vehicle distance and column gap. Figure 2 shows these changes. It is evident from the graph that the per-hour road capacity will range between 150 and 250 vehicles if a column maintains vehicle distances of 25-50 m and moves at an average speed of 20-30 km/hr. We should note that such a road capacity is impossible on many roads. Even in well-developed theaters of military operations only 30-40 percent of the total mileage of existing roads will offer such a road capacity. The remaining 60-70 percent will be routes with a capacity not exceeding 150 vehicles per hour, due to the limited speed of columns proceeding on these routes. This figure may be considerably smaller in other theaters. Therefore when determining the requisite number of routes for adequate securement of movement and maneuver of troops, each time the problem will require a differentiated approach, taking into consideration the traffic capacity of existing roads. In one case the operational-tactical capacity (if it is less than the technical) should be used as the value for computation, while in another case only the technical road capacity should be used.

Thus if we know the road capacity (N) and number of combat and transport vehicles to pass along a given section of route per unit of time (T), we can determine the requisite number of routes in the zone of advance (R) from the ratio:

$$R = \frac{T_{veh/hr}}{N_{veh/hr}}$$

Finally, in determining troop route requirements one must bear in mind the fact that during the course of combat operations the enemy will be conducting continuous reconnaissance and will be attacking lines of communication and troops, which will disrupt movement on the roads. The closer the advancing troops approach to the forward units, the greater the degree to which they are subject to hostile activity, and consequently route utilization becomes increasingly difficult. Therefore, when determining the requisite number of routes, one should also take into consideration the degree to which the potential road capacity can be realized. For this purpose we shall introduce a road capacity realization factor (K_r), the numerical value of which we shall derive from the ratio of potential daily traffic flow intensity to the operational-tactical road capacity (as has been stated above, we can obtain the latter from the graph). Daily traffic flow intensity is dictated by tactical conditions. It can be either specified or computed, but the latter case requires special, fairly complex studies, which we do not consider feasible to discuss in this article.

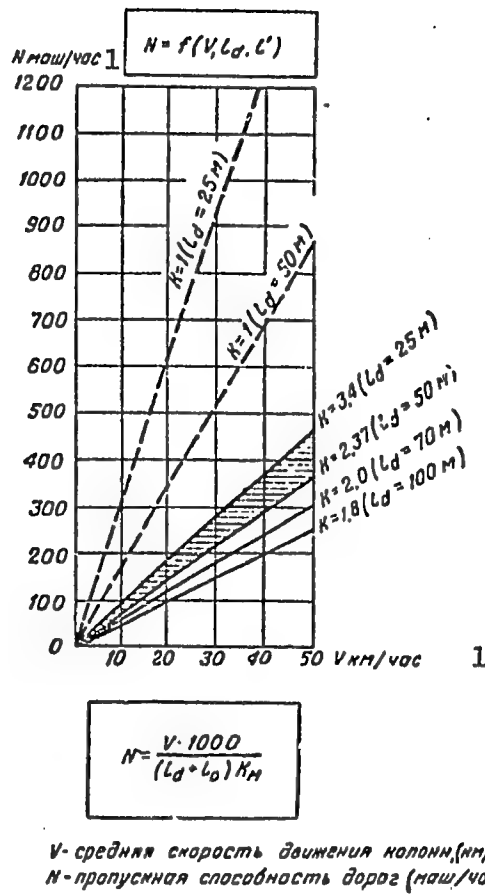


Figure 2. Operational-tactical road capacity.

Key to figure: 1 -- veh/hr; V -- column average speed (km/hr); N -- road capacity (veh/hr)

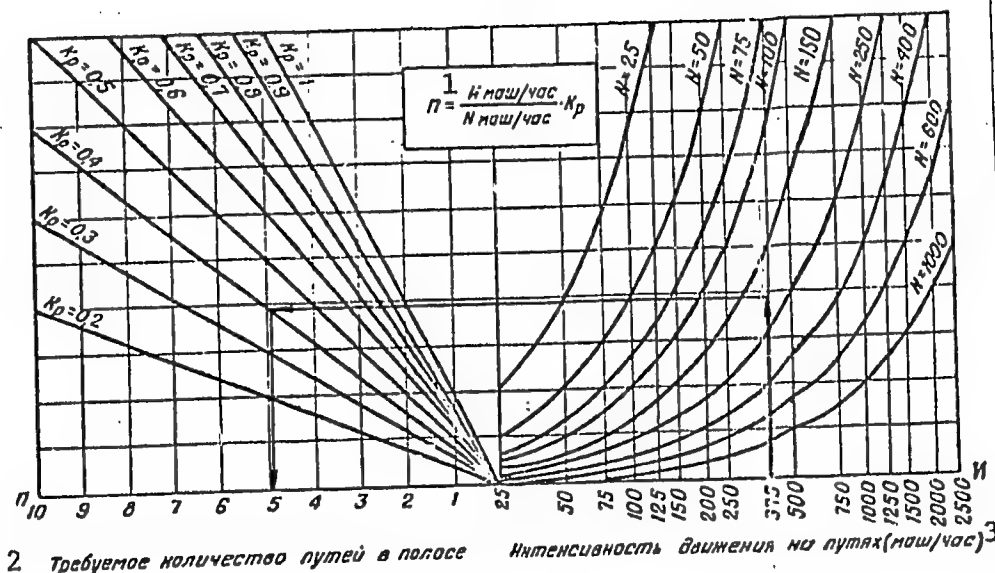


Figure 3. Nomogram for determining requisite number of routes in a zone of advance.

Key to figure: 1 -- veh/hr; 2 -- required number of routes in zone; 3 -- intensity of traffic flow on routes (veh/hr)

The calculations we have made of probable enemy activity against troops and lines of communication indicate that, depending on the conditions of conduct of combat operations, need and capability to displace units, the road capacity realization factor will be 0.3-0.5 for maneuver roads and 0.4-0.7 for basic military roads. It follows that in order to eliminate to a maximum degree disruption of traffic flow on maneuver routes and basic military roads, in order to avoid the creation of bottlenecks and in order not to give the adversary the opportunity to impede planned troop movements, the number of routes in the zone of advance should be determined taking into account the potential degree of realization of road capacity. All the above-mentioned computations can be quickly performed by utilizing a nomogram (Figure 3). For this one should first of all specify potential route traffic intensity; secondly, using the graph (Figure 2), one determines operational-tactical road capacity; third, one determines the potential road capacity realization factor. Armed with these data, it is not difficult to determine the requisite number of routes in a zone of advance.

Example. Volume of traffic on routes is $T=350-400$ veh/hr; operational-tactical road capacity is $N=180-200$ veh/hr; road capacity realization factor is $K_r=0.4$. We determine with the nomogram that under these conditions the zone of advance must contain five routes.

This method can also be employed for operational-tactical assessment of the road network in a zone of advance. Individual points in this method require practical verification, in order that it can be utilized under various conditions of the engagement and operation on various terrain.

FOOTNOTES

1. Voyennaya Mysl', No 2, 1959, pp 45-49; No 12, 1961, pp 34-45; No 2, 1964, pp 30-37; No 10, pp 48-55; No 12, pp 40-47; No 4, 1967, pp 56-62; No 12, pp 58-63.
2. Voyennaya Mysl', No 4, 1967, page 58; No 12, page 61.

ARTIFICIAL EARTH SATELLITES IN THE EARLY WARNING SYSTEM

(Based on Materials Published in the Foreign Press)

Engr-Lt Col Yu. Yur'yev

In American plans to prepare for a nuclear world war, alongside intensive development of strategic offensive forces and the deployment of an ABM system, great importance is attached to a reliable, effective early warning system. This system has the task of providing the earliest possible detection of the launching of a massive enemy nuclear missile attack, with warning of such an attack to be communicated to top government and military officials, armed forces branch commands, air defense command and civil defense entities. It is believed that information provided by the early warning system in combination with information provided by other types of strategic intelligence should constitute the basis for putting strategic nuclear offensive forces into action. For the benefit of the ABM system the early warning system determines the trajectories of the incoming hostile missiles at as great a distance from the defended installations as possible.

Work has been going on for years to deploy and improve the U.S. early warning system. The first step in this direction was the establishment of the BMEWS¹ radar system which, in the opinion of U.S. experts, can provide warning on the launching of missiles and orbital vehicles across a large zone, encompassing the arctic regions, Eastern Siberia, the northern part of the Soviet Union and all the countries of Eastern Europe down to the Turkish border, 15 to 20 minutes before they appear over U.S. territory. Subsequently testing was initiated on below-the-horizon radar in the 10-100 meter and 10-20 thousand meter band, radars which are capable of detecting ascending rockets immediately after launch.

At the present time research is being conducted in the area of rocket detection based on high-frequency oscillations occurring in the ionosphere caused by expansion of the exhaust gas stream emitted by a rocket engine, on the basis of solar radiation reflected from the rarefied wake of gases in the middle segment of a rocket trajectory, on the basis of change in atmospheric pressure in the vicinity of the launch site, etc.

A special place in this research is occupied by studies dealing with employment of artificial earth satellites in early warning systems, since satellites, due to their high altitude above the earth's surface, constitute ideal observation platforms. Evidently if such a satellite were equipped with radar or some other type of intelligence-gathering device, it would be possible to spot a launched missile as soon as it separates

from the launch apparatus. In contrast to conventional ground radar sites, which spot missiles only when they rise above the horizon, satellites can maintain direct observation of the launch sites. This is due to the fact that the entire surface of the earth gradually passes under a satellite launched into a polar orbit whose plane passes through the north and south pole. In other words the earth "presents" itself to the reconnaissance satellite for a sequential inspection. A system of several of these satellites will have the capability of maintaining continuous observation of the entire surface of the earth, increasing missile attack warning time to 30-35 minutes (the flight time of an ICBM).

The number of satellites in the early warning system is determined primarily by altitude and inclination of the selected orbit. The lower a satellite's altitude above the earth's surface, the smaller its "field of view." On the other hand, satellites launched into orbit with a moderate inclination will be unable to observe the earth's polar regions. On the basis of this it is believed that it is advisable to launch early warning satellites into orbit up to several thousand kilometers high at an inclination of approximately 90°.

The most promising from the standpoint of continuity of observation are stationary and synchronous orbits, in which a satellite completes one revolution around the earth every 24 hours at an altitude of 35,800 km. If a satellite is in an orbit whose plane coincides with the plane of the equator, its angular velocity coincides with the earth's angular velocity of rotation, and the satellite hangs suspended as it were above a specified point on the earth's equator, presenting a fixed observation platform. This type of orbit is called stationary.

With a synchronous orbit the plane of the satellite's orbit forms a certain angle with the plane of the equator, due to which the satellite, in making one revolution around the earth, offers the capability of observation of the north and south polar regions, which remain beyond the field of view of a stationary satellite. At the same time a synchronous satellite possesses the capability of appearing above each point on the earth's surface at the same time. This makes it possible to observe "missile threat" areas on the potential enemy's territory. Elementary calculations show that a system of 3-4 stationary and synchronous satellites is sufficient to ensure continuous observation of the entire surface of the earth.

The effectiveness of an early warning satellite system also depends to a large degree on the type and sensitivity of the reconnaissance gear it carries on board. This determines the performance capabilities of satellites. According to reports in the foreign press, the best capabilities from the standpoint of reliability and efficiency of detection of rocket launchings are possessed by satellites carrying infrared equipment capable of detecting the exhaust flame of rocket engines at distances of several

hundred and even thousands of kilometers. The main advantage of employing infrared equipment is that, in contrast to radar, which emits probing pulses and forms highly-directional beams of electromagnetic waves, a passive infrared system also picks up infrared (thermal) rays emitted by any object with a temperature of above absolute zero (-273.16°C). Therefore infrared equipment can detect ballistic missiles and their warheads in practically any segment of flight, since they comprise powerful sources of heat radiation even when their engines are not operating. Particularly strong infrared radiation is produced by the stream of gases ejected by operating rocket engines during the powered segment of flight. One must, however, take into consideration the difficulty of detecting the object of interest on a background of such "hot" sources of radiation as factories, industrial plants, etc.

Infrared radiation is similar to visible light in its nature and properties. It covers that band within the electromagnetic spectrum from 0.76μ to 500μ , and operations to detect sources of infrared radiation with infrared equipment are in many ways similar to operations involving the use of optical equipment for the same purpose.

The principle of operation of infrared equipment is fairly simple. The thermal radiation detection device, called an infrared detector, is mounted on the satellite in such a manner that its sensing element is continuously aimed in space in that direction from which ballistic missiles are expected to appear. For this purpose the satellite is oriented with a high degree of accuracy by an on-board three-axis stabilization system.

The temperature of ambient space is very low compared with the temperature of an ICBM exhaust flame, as a consequence of which the energy of the background radiation striking the satellite infrared detector is insignificant. As soon as a rocket, whose maximum intensity and consequently infrared radiation wavelength correspond to the receiver's sensitivity range appears in the receiving device's field of view, a signal is excited, which warns of the appearance of a target of interest.

While certain characteristics simplifying identification of signals reflected from the target (for example, change in pulse frequency or repetition according to a specific law, change in variation of carrier frequency, etc) can be imparted to radiated signals with the aid of radar, with a passive infrared detection system identification of the radiating object can be effected only by analyzing the received infrared radiation and determining its internal features which are inherent only in the given radiating object.

After an infrared signal has been received, satellite on-board equipment analyzes the received radiation, on the basis of which the characteristics of the radiating object are examined, the spectral composition of the

received radiation is determined, the velocity of the detected object is estimated and, if possible, its direction of movement. The end objective of all these operations is establishment of the fact that what has been detected is the launching of a ballistic missile and not a passing meteorite, a sun flash, a cloud-reflected ray, or other similar phenomena.

Practical solution to the problem of detecting and identifying a target emitting infrared radiation constitutes a very difficult task. The fact is that infrared rays are very strongly absorbed by the earth's atmosphere, in particular by water vapor, carbon dioxide, ozone, and dust. But the degree of their absorption differs in different wavelengths. The atmosphere contains so-called "windows," in which this radiation is very little attenuated (in the wave bands 3-5, 7-9.5, 10-13.5 μ). Infrared detectors picking up these bands are used to detect ICBM exhaust flames, in order that the rocket's thermal radiation can "pierce" the atmosphere and reach the early warning system satellite infrared receiver.

The problem of missile exhaust detection, however, cannot always be completely solved in this manner. Rocket infrared radiation can be of a different wavelength due to different chemical composition of the fuel employed. Therefore the infrared characteristics of liquid-fuel missiles differ somewhat from those of solid-fuel missiles, foreign experts claim, which complicates the problem of identifying them and isolating the signal on the background of atmospheric radiation. In connection with this it becomes necessary in target detection and identification to determine wavelength and intensity of radiation not only of the missile but of the ambient atmosphere as well. Fulfillment of this requirement leads to greater complexity of satellite on-board equipment.

In addition, target discrimination on the basis of infrared radiation is complicated by the fact that the principal products discharged from the nozzle of an operating rocket engine are carbon dioxide and water vapor. But they also are found (along with other substances) in the earth's atmosphere. Therefore the problem also consists in being able to distinguish radiation coming from the carbon dioxide and water vapor of a rocket exhaust from atmospheric. Discrimination is assisted only by the fact that the former have a higher temperature and greater density.

Finally, one must note the influence of such factors as inhomogeneity of particles in the atmosphere, difference in chemical composition of substances in the atmosphere at different altitudes and reflection of sunlight from high-altitude clouds. In order to overcome the interference caused by these factors, studies are being conducted on the properties and composition of the atmosphere at all altitudes, the sensitivity of infrared radiation detectors is being increased, and ultraviolet radiation

detectors are being developed for combined utilization with infrared detectors. The necessity of using ultraviolet detectors is due to the fact that the radiation maximum of a ballistic missile exhaust flame lies in the infrared band, while that of clouds is in the visible and ultraviolet bands. By comparing the results of measurements with these two types of detectors it is possible on the background of radiation from clouds to isolate the signal coming from an operating rocket engine.

These are the principal features of employment of infrared equipment on board satellites to detect ballistic missile launchings. Realization of the idea of developing reconnaissance satellites for this purpose can be examined with the example of U.S. efforts within the framework of development of a comprehensive ballistic missile early warning system consisting of facilities on the ground and in space.

Practical efforts at ballistic missile detection with the aid of satellites began in the United States in 1960 with the launching of Midas satellites.² It was believed that these satellites would be able substantially to increase the effective range of the detection system by spotting ballistic missiles immediately after launch. Data on satellite-detected missiles would be immediately transmitted by special communications lines to the ABM system control center as priority importance information. It is believed that preliminary computation of the trajectory parameters of detected missiles will make it possible in the first place promptly to ready for action all ground facilities for the detection, tracking and destruction of incoming warheads and, in the second place, to warn the population and authorities of the area threatened by nuclear missile attack.

The first Midas satellite, launched in 1961 into an orbit 3000 km high, detected with the aid of infrared equipment a Titan ICBM at an altitude of 60 km 90 seconds after launching from the Atlantic missile range. Data on the missile's flight were immediately transmitted to ground stations. This type of experiment was repeated several times.

In the course of launching Midas satellites it was determined that the infrared radiation detectors carried on board many times are unable to discriminate the radiation from rocket engine exhaust on the background of solar radiation reflected from cloud tops at very high altitudes. In addition, the satellite orientation system proved insufficiently precise in operation, and the satellite was too complex in design.

In connection with this, launchings of Midas satellites were terminated in the spring of 1962, and all work on this problem was transferred to the research category.³ An ambitious program was announced, calling for thorough study of the infrared characteristics of the atmosphere at various altitudes, the features of infrared radiation of rocket engines of various

types, as well as the development of higher-sensitivity infrared detectors. According to information in the press, in 1963 two secret U.S. satellites successfully detected launchings on the Atlantic and Pacific ranges not only of Titan and Atlas liquid-fuel ballistic missiles but also of solid-fuel Minuteman missiles.

Study of prospects for employing infrared equipment to detect missiles in the powered segment of flight continued with the launchings of the Gemini two-man spacecraft, in addition to solving problems connected with preparations for the Apollo Program. On several Gemini missions the astronauts were able on several occasions, with the assistance of such equipment, to detect the launching of ballistic missiles and record with the aid of radiation meters the infrared radiation of the exhaust of rockets both in flight and in special static test stands. The crew of Gemini-7 picked up radiation from the nose cone of a Minuteman ICBM during re-entry.

Subsequently these studies were conducted on a larger scale. According to available information,⁴ the U.S. Air Force reached a decision to establish a satellite early warning system with the task of detecting ICBMs in the initial and middle segments of flight, as well as missiles launched from submarines. The developers of this system intended for missile detection during the initial segment of flight to be effected by picking up infrared radiation from the rocket exhaust, and during the middle segment -- infrared radiation from the slightly-heated missile body or separated nose cone on the background of "cold" space. It is planned to install radars on satellites for the detection of submarine-launched missiles.

In conformity with these plans, under the aegis of the U.S. Air Force space and missile systems directorate, SAMSO, studies were initiated to develop infrared radiation detectors of various types, high-precision satellite orientation systems (including systems employing the star sky background and gravity gradient), long-life on-board power systems and satellite temperature control devices. Equipment is also being developed for the fast transmission and processing of information pertaining to detection of missile launches and optimal display of this information at ABM system command posts. Scientists are studying the possibility of developing infrared equipment to photograph the earth's surface from a satellite in synchronous orbit, with the obtained information transmitted to ground receiving stations on a real-time scale.

Infrared equipment of a new type which, in contrast to the equipment on board the early Midas satellites, would operate in the band of absorption of rocket infrared radiation by atmospheric carbon dioxide gas, was built with the aim of developing reliable methods of detecting ballistic missile launchings. This is done so that the satellite detectors can react only to the strong signals emanating from the rocket exhaust. All weaker

interfering background radiation signals with this method of building detection gear will be "cut off" by atmospheric absorption. The gradual increase in infrared radiation received, as a missile ascends, as well as its specific spectral composition, serve as criteria for identifying a ballistic missile.

Program 749 involves a study of the possibility of building satellites to detect and track ballistic missiles launched from submarines. For this purpose the SAMSO directorate awarded parallel contracts of 1 million dollars each to Hughes Aircraft and General Electric, with the technical assistance of Westinghouse Electric. It is planned to use Titan IIIC boosters to launch satellites of this type

Problems connected with building satellites to detect and track ballistic missiles in the middle segment of flight are being studied on Air Force contracts by TRV Systems and Philco-Ford. These satellites would be launched into low orbit, carrying equipment recording at distances of up to 2400 km infrared radiation emitted by a missile body or nose cone. SAMSO has already announced a competition for development of such equipment within the framework of the High Highstar Program. It is planned to test infrared telescopes developed on the basis of parallel contracts with Autonetics and Hughes Aircraft.

Reconnaissance satellites to detect missiles in the initial segment of flight are being developed by TRV Systems under contract with SAMSO, Program 647. These satellites have been designated IS,⁵ since in addition to the detection of surface and submarine missile launchings they have such missions as recording troop movements and observing military installations of the potential enemy, determining the coordinates of nuclear explosions and monitoring the results of nuclear strikes, conducting strategic weather reconnaissance, etc (a total of approximately 10 tasks).

IS satellites carry for the detection of infrared radiation from a launched missile telescopes manufactured by Aerojet-General, which record infrared radiation in the 3.5 and 10.6 μ bands.⁶ This satellite weighs approximately 800 kg, is 7 m in length and 3 m in diameter. It is launched into a stationary orbit above the Indian Ocean or the Western Pacific by a Titan IIIC rocket.

In addition to infrared sensors, IS satellites carry Aerojet-General optical gear for a preliminary assessment of the weather situation in various parts of the earth. It is believed that due to a rather high resolving power of 80 lines per mm (approximately 300 meters at the earth's surface), in the absence of cloud cover this equipment can be utilized to observe ICBM launch sites as a supplement to survey and detail photoreconnaissance satellites.

It is planned to control early warning satellites in stationary orbit from the control center in Sunnyvale, California, with satellite information transmitted to a special station in Manhattan Beach, California.

Beginning in 1975 a special relay satellite, to be built under Program 313, will be used to transmit to the control center information from satellites beyond line-of-sight.⁷ In connection with this, SAMSO has announced a competition among firms vying to develop this satellite. It is anticipated that the relay satellite will carry a highly-directional antenna and wideband communications equipment, operating in the millimeter band, in order to ensure communications secrecy. Prior to such a time as the repeater satellite goes into operation, information from early warning system satellites will be received by a tracking station on Guam, and relayed from there to the North American Continental Air Defense Command Post in Colorado Springs by submarine cable (the Guam facility went into operation in 1969). In addition, information from satellites will be picked up by two special stations in Australia: in Pine [Tep] (not far from Alice Springs), and near Woomera (in South Australia).

The high intensity of early warning satellites research and testing indicates that, as we have stated above, the United States is devoting the most serious attention to this problem.

In addition to the development of space early warning devices, the United States is working extensively on the improvement of existing and development of new systems with the same mission. Their goal is to increase the warning time and improve reliability of warning of initiation of a hostile missile attack. In the United States preference is being shown, however, to space systems (219 million dollars in appropriations were requested for 1971 by the Defense Department for Program 647).⁸ It is probable that the United States will seek to put a space early warning system into continuous operation in the very near future.

FOOTNOTES

1. Ballistic Missile Early Warning System.
2. Missile Defense Alarm System.
3. At the beginning of 1963 a report appeared in the press that spokesmen for the U.S. Defense Department were deliberately playing down in their public statements success achieved in the development of infrared radiation detectors for MIDAS satellites.

4. Aviation Week, No 3, 1970, page 21.
5. Integrated Satellites.
6. Flying Review International, No 9, 1970, page 73.
7. Aerospace Daily, No 2, 1970, page 11; Air et Cosmos, No 324, 1970, page 16; Aviation Week, No 4, 1970, page 13.
8. Space/Aeronautics, No 4, 1970, pp 18-22.

CONCERNING THE SUBJECT MATTER, CONTENT AND STRUCTURE OF A COURSE IN
MILITARY ECONOMICS

(Reader Responses)*

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Increased interest in the problems of military economics is a notable feature of the intellectual life of military cadres.

Quite obvious is an objective necessity of more fully taking into account the economic factor both in accomplishing the major national tasks of strengthening this country's defense capability and in various areas of military activity proper. It is dictated by an intensification of the interrelation and interdependence of economic and military organizational development. The party accomplishes these tasks in a unified manner, guided by the instructions of V. I. Lenin. The Central Committee CPSU draft "Directives of the 24th CPSU Congress on the 1971-1975 Five-Year Soviet Economic Development Plan" state: "The Ninth Five-Year plan will be an important stage in the further advance of Soviet society along the road toward communism, in building its material and technological base and in strengthening the nation's economic and defense might."

The party's course toward comprehensive intensification of social production and its improved effectiveness evokes in all categories of military personnel the endeavor to work efficiently, to accomplish the specific tasks of combat training with minimum outlays of manpower, resources and time. This requires increased economic sophistication on the part of all military personnel, and by officers and general officers in particular. Party instructions pertaining to improvement in cadre training, particularly in the area of Marxist-Leninist economic theory, theory and practice of control and management, scientific organization of labor, new methods of planning and economic incentive, as well as application of economic-mathematical methods and modern computer hardware apply in full measure to military cadres as well.

Various problems in this area are studied at military educational institutions. They include determination of profile in the teaching of political economy, inclusion of specific military economic topics in courses in political economy, specific economic systems, and military disciplines. This is not sufficient, however, for there are a considerable number of problems which can be examined by military economics, which comprises its

* See Voyennaya Mysl', No 7, 1969; No 1, 8, 9, 1970.

own special subject. Vigorous work must be done to examine the problems of this science, and a special course should be offered at military educational institutions.

Considerable work has been done by the political economy and military economics department at the Military Political Academy imeni V. I. Lenin, as well as at other military educational institutions. The present course in military economics, however, should be revised and improved. Promoting a broadening of officer intellectual horizons and economics training, it provides little of that specific knowledge which is so essential in daily service.

In order to settle the question of the content and structure of a course in military economics, it is important to determine at the outset just what military economics is, what its subject matter is. At the present time various points of view are being expressed, which is quite understandable: there are sciences which have existed for centuries, and yet debates about their subject matter still rage on. One can hardly claim exhaustive definitions even today. It is also important to define precisely enough for practical purposes the boundaries of this science and its specific problems, to determine its place among the other sciences.

We shall begin with a definition of the object of this science. At the present time two points of view are fairly prevalent. According to one of the views, military economics comprises the entire national economy re-gearred to war needs and wartime operations; according to the other view it is merely a part of the national economy, which produces military products both in peacetime and wartime.

The question, however, is not which view should be given preference. Neither the national economy as a whole nor any part of it exhausts the entire subject of military economics as a science. It should at all times involve the armed forces and their functioning both in time of peace and war. The military and economic might of the state is realized here; the effectiveness of the military economic system finds expression. In this light another approach to military economics would seem expedient: it should be viewed not as a more or less broad sum total of the branches of the economy but rather as an aggregate of special economic relations. With this approach we can more precisely define the subject matter and content of military economic science, its boundaries and relationships with other sciences.

We know that economics as an aggregate of production relations includes relations connected with production, distribution, exchange and consumption of material goods. In this sense military economics comprises specific

economic relations, that is, relations connected with the production, distribution, exchange and consumption of goods of military designation. These relations take place in various spheres of the vital activities of society: in the nation's economy as a whole, in that sector directly linked with the armed forces, and immediately in the armed forces. The aggregate of these relations (we shall call them military economic relations) comprises military economics. As such it can exist and does exist both in time of peace and war, both in the capitalist and socialist society. The existence of military economics under socialism is engendered not by the nature of the socialist system but rather by the military threat presented by imperialism. Arising on the basis of this external cause, military economics under socialism develops on the basis of socialist production relations, which determine its root differences from capitalist military economics and its advantages over it.

Any definition of military economics influences the answer to the question of the subject matter of this science, determination of the range of its problems, the content and logic of a formal course in this subject.

If we define military economics as "a special qualitative state of the economy,"¹ in the first place the object and subject of the science coincide with the object and subject of political economy. Military economics comprises a special chapter of political economy -- the political economy of war.² In the second place, this science does not always have an object, for a wartime economy exists only for the duration of a war, and not during every war. What does this science study today? A hypothetical picture of the nation's economy in a postulated war?

If we define military economics as that part of the economy which involves support and supply of the armed forces in time of war and peace, then the subject coincides with the subject of specific economic systems, boils down to elucidating the specific features of military industry, military finances, military supply, etc.

Thus a shortcoming of both points of view is an underestimate of the relations and problems connected with the distribution, exchange and consumption of military products in peacetime and wartime, economic problems of military activity, and armed forces organizational development. But these relations and problems are so specific that neither political economy nor specific economic subjects can provide the solution, no matter what extent to which we broaden their subject matter.

Of considerable interest are suggestions to create a special discipline -- armed forces economics, which in the opinion of Comrade Lagovskiy should examine "military economic problems only in the interest of the armed

forces proper, for the purpose of establishing ways and recommendations to achieve maximum expedient expenditure of resources for armed forces organizational development, supply, combat training and attainment of a continuously high state of combat readiness."³

It would seem that we need two military economic disciplines -- theoretical and applied. But this is incorrect. In Lagovskiy's article the author essentially is dealing with that group of military economic relations which pertain to distribution and consumption of products of military designation, consequently to the subject of military economics.

Here are revealed first of all the features of military economics as a juncture science, which studies the kindred relations of two interlinked objects -- economics and armed forces; secondly, features of approach to this science by the economist and military professional. Proceeding from the standpoint of economics and analyzing the military problems of the economic sciences, we move from the sphere of political economy and specific economic subjects to the sphere of military economic relations. Examining and synthesizing current economic problems of wars and military organizational development, proceeding from military science and practice, we arrive at theory of military economics from its other side; we see it in a somewhat different light.

It is important correctly to understand the plus and minus points of both these approaches, their certain one-sidedness. This makes it possible on the one hand to avoid excessive abstractness, a separation between military economic science and the practical problems of military affairs, as well as to avoid a narrow practical approach on the other.

We shall now attempt to define more specifically the content and structure of a course in military economics, to break down the aggregate of military economic relations, to pinpoint the basic problems and to establish their interrelations and subordination.

A logical continuation of political economy and specific economic sciences is an investigation of the features of production, distribution, exchange and consumption of military product, the mechanism of effect of economic laws in the area of defense, scientific analysis of substantial, persistent relationships of military economic phenomena and processes, and disclosure of specific military economic patterns. Here we shall be dealing with relations which change substantially from one period to the next, and even from war to war. Nevertheless, this does not rule out a certain succession of investigated patterns and principles, nor does it minimize the importance of historical experience. Military economics should study the experience of economic backup of wars, specifying in this those grains of truth which have not lost their practical significance.

Consideration of the dialectical relationship between wars and economics existing in the real world and developing together with the development of productive resources is also important for another reason. The level of productive forces and nature of the economic system (and political system as well) predetermines the character, technical base and scale of war. Military economics is faced with specific tasks: the study, measurement and comparison of the economic capabilities of nations and coalitions, study of the ways and forms of their transformation into real military power, determination of the degree of mobilization of the economy for war, ways and means of increasing its survivability, expedient forms of organization and management of the economy, etc. The practical research goal consists in elaborating a scientifically substantiated military economic long-range plan for the state (coalition), as well as elucidation of the strong points and vulnerable points in the enemy's economic system, in the interest of more effective action against that economy.

The task of military economics is elaboration of scientific methods of economic substantiation of practical solutions at various levels of management and in different areas of activity -- from recommendations in the area of the military technical policy of the state, to selection of the most effective variants of operations, models of combat equipment, etc. Elaboration of the fundamentals of military economic analysis and a system of military economic criteria is consequently essential.

Also possible is a broader examination of the basic problems of science, but even the above is sufficient to give a general picture of the structure and content of a course to be offered at every military higher educational institution. This course can consist of four sections.

The first (introductory) section would reveal the fundamental theses of Marxist-Leninist doctrine on the relationship between war and economics, on this basis offering a brief historical survey of the methods and forms of economic securement and support of wars, demonstrating the process of genesis and development of a war economy, critically analyzing bourgeois military economic concepts, and discussing the basic features and advantages of the war economy of a socialist state in comparison with the war economy of imperialist countries (based on the experience of past wars). It is advisable thereby to reveal the content of basic military economic categories. The section concludes with a general description of root changes in military affairs and economic support of war as a result of the scientific and technological revolution, which prepares the transition to the second section of the course.

The second section is devoted to an examination of the general economic problems of contemporary wars. The role and place of branches of the economy in the economic support of wars, physical distribution and

survivability of the economy, manpower resources, economic mobilization, administration and management of the war economy, and military action against an economy. Problems of military economic cooperation among socialist nations are also examined in this section. The section is concluded with a description of the basic features of the Soviet military economic concept and a critical analysis of modern military economic concepts of imperialism.

Thus the second section examines fundamental problems contained in the course in military economics as taught at the V. I. Lenin Academy. Problems of the economics of coalition war are not discussed in a separate section, since they should be examined in an organic relationship, when elucidating the fundamental economic problems of modern wars.

The third section contains particular military economic problems and is structured on the basis of the school's specialization profile. This section should deal with matters of economic accountability, rear services, storage and maintenance, operation and repair of weapons and combat equipment, as well as problems of military economic analysis. Problems of economic justification of the senior research paper can be included in the course at many military educational institutions.

The fourth section deals with problems of the economics of military house-keeping and economic activities in military units and on board naval ships.

OUTLINE OF COURSE IN MILITARY ECONOMICS

1. Subject matter and objectives of course in military economics

I. Introductory Section

2. Marxism-Leninism on the relationship between war and economics.
Economic principles of the military might of states.
3. Development of methods of economic securement and support of wars:
Prehistory of military economics;
World War I and military economics;
Military economics in World War II;
Advantages of Soviet military economics.
4. The scientific and technological revolution. Radical changes in military affairs and economic support of contemporary wars.

II. General Economic Problems of Contemporary Wars

5. Role and place of branches of the economy in economic support of a war. War and manpower resources.

6. Geographic distribution and survivability of an economy. Military action against an economy.
7. Economic mobilization. Management and control of a military economy in peace and war.
8. Military economic cooperation of socialist nations.
9. Basic features of the Soviet military economic concept. Critique of the military economic concepts of imperialism.

III. Economics of Production, Distribution and Consumption of Military Products

10. Features of commodity-money relations and economic accountability in the area of national defense.
11. Functions of Armed Forces rear services.
12. Fundamentals of military economic analysis:
 - Economic and military technical parameters of combat equipment, weapons systems, their interrelationships and measurement;
 - Content and methodology of economic analysis of the military operation (problems of combat training);
 - Place and role of the economic factor in decision-making.

IV. Economics of Military Housekeeping and Economic Activities in the Military Unit (Naval Ship)

13. Supply services.
14. Unit finances.
15. Economic activities in the unit.

Seminars:

1. Economic principles of a nation's military strength.
2. Economic problems of contemporary wars.
3. On one of the topics of Section III.

The proposed course structural outline is tailored to the needs of higher military command and political schools. Higher military engineering schools will require some modification of Section III of the outline, pertaining to area of training specialization. Some items contained in the outline (for example, those in Section IV) are handled in other courses at a number of military educational institutions. Depending on specific conditions, various decisions can be made pertaining to the advisability of dealing with them in a given course. The requisite time can be assigned at the expense of hours allocated for adjacent disciplines.

FOOTNOTES

1. Voyennaya Mysl', No 7, 1969.
2. See N. Voznesenskiy: Voyennaya ekonomika SSSR v period Otechestvennoy voyny (War Economy of the USSR During the Great Patriotic War), Gospolitizdat, 1948, pp 3, 10.
3. Voyennaya Mysl', No 1, 1970, page 60.

PROGRAMMED LEARNING -- AN EFFECTIVE WAY TO IMPROVE THE TRAINING PROCESS*

By Col I. Vakurov and Professor Col A. Butivchenko, Doctor of
Military Sciences

The ideas, or as they are termed, principles of programmed learning, which specify careful selection and logical arrangement of curricular material, its breakdown into specific meaningful doses, as well as systematic verification and self-testing of mastery of the material, that is implementation of feedback and continuous management of the students' cognitive activity, existed long before the term "programmed learning" first appeared.

As the number of persons studying simultaneously in various groups increased, however, it became more difficult to verify their mastery of the material; feedback deteriorated, as did capability to manage and control student cognitive activity. With simultaneous study by a large number of students in the same groups, the above-enumerated factors make the teacher's task so difficult that he is physically unable to manage and control effectively all stages of the learning process.

An answer to this problem has been found as a result of scientific and technological advances, particularly achievements in the area of electronics, cybernetics and a number of other sciences. It has become possible to transfer some functions (particularly information output and testing of information assimilation) performed by the instructor to special technical devices: teaching machines, simulators, automatic testing units, etc.

Even in this case, however, the main role in the teaching process is still played by the instructor, for in order to utilize machines it is necessary to elaborate for them special teaching programs which include not only course information but also a carefully-planned system of control of the student's effort at all stages of his cognitive activity. The term "programmed learning," that is learning on the basis of a special teaching program placed in the machine, arose precisely in connection with the need to develop these special teaching programs. The term "programmed learning," in analogy, for example, with the terms "computer-controlled blast-furnace process," "numerically-controlled machine tool," etc, raises no doubts or objections, particularly since it has been accepted throughout the world.

* The editors received a number of responses to an article by Lt Gen P. Vashurin entitled "More Extensively Adopting Programmed Learning" (Voyennaya Mysl, No 12, 1970). We are publishing two of these; the remaining responses, as well as the editors' conclusions, will appear in subsequent issues.

But what about the term "machineless programmed learning," which the author of the article discusses? (As well as others!)

Since "machineless programmed learning" provides a certain individualization of learning and to a certain degree enables one to control the cognitive activity of students, this term is just as entitled to existence as the term "dismounted soldier performing as tank" [peshiy po tankovomu]. Of course this is not programmed learning in the full meaning of the term, but it does approximate it to a certain degree.

If we approach from this standpoint Vashurin's deliberations, conclusions and recommendations, we readily note that he spoke very little in his article about genuine programmed learning, and particularly about experience in its utilization. It is true that at the end of the article, where he discusses complex computer-based teaching units, a system of peripheral self-learning stations linked with a teaching center, the author has drawn an enticing picture, but utilization of complex teaching units at the higher educational institution is a thing of the future.

At the present time, as experience shows, the possibilities of programmed learning are extremely limited at the higher school, with flow-type group training (particularly in such disciplines as tactics, operational art, and the social sciences). This is first and foremost because in teaching a number of disciplines (operational-tactical, social sciences) a formal-logical approach to presentation of the course material, without which it is impossible to program it for a teaching machine, is not always allowable.

The experience of recent years and the results of numerous experiments at a number of military educational institutions, particularly of an engineering specialization (which possess more favorable conditions for programmed teaching than other higher educational institutions), permit us to draw the following conclusions.

Programmed teaching, including automated testing, has not been employed for lecture courses presented in section-organized lecture halls for the simple reason that acquisition of information on assimilation of course material by 100 and more students and subsequent processing of this information by the instructor, with the aim of immediate response to feedback results, prove to be a difficult task from the standpoint both of time required for this job and the greater expenditure of funds to equip such "flow-type" lecture hall facilities.

At class-group and particularly practical and laboratory exercises, as well as for student independent study, programmed teaching is quite well suited for a number of disciplines and courses and produces good results.

Out of the numerous teaching machines and various technical devices devised at higher educational institutions during the last 10 years, many have proven unworkable. Testing devices such as the Lastochka, KISI-5, OM-7-4 and others are being successfully employed in the learning process.

Simulators with a special programmed device are being more and more extensively utilized in the learning process.

Teaching and testing machines are employed both in the system of automated classrooms (sometimes called programmed learning classrooms) and individually, particularly for independent study.

Programmed learning is successful as a rule in the area of the social sciences and general engineering disciplines, and particularly at exercises dealing with highly practical aspects of the course. At many higher educational institutions programmed learning is employed in the study of physics, chemistry, mathematics and other social sciences and general engineering disciplines. Nonmachine programmed learning has produced good results at many higher educational institutions. A large number of so-called programmed textbooks, various test cards, etc have been devised.

In all these efforts, however, as Lt Gen P. Vashurin correctly notes, there is no suitable organizational principle. The determining element in this extensive and complex activity is chiefly enthusiasm, not scientifically-substantiated methodological expediency.

A major inhibiting element in the spread of programmed learning is the lack of requisite technical devices at military educational institutions.* Obviously what is needed here is a common approach, a common methodological policy, if only at military educational institutions of like profile.

It is a well-known fact that in industry, such as at plants producing identical or similar products, mass production as a rule is effected on the basis of an identical and most advanced manufacturing process. Why is it that outmoded methods are permitted in education, which today has also become mass-production (industrial) in character? To draw a further analogy with industry, teaching methods can be called the industrial processes of learning. They should also be based on the achievements of educational science and utilization of the entire technical arsenal of devices providing high labor productivity on the part of both instructors and students.

* As is well known, technical devices for programmed learning are presently not specified in the facilities and equipment lists of military educational institutions.

The entire complex learning process should be carefully planned and secured, that is, it is essential to possess for each discipline a thoroughly elaborated particular methodology. Programmed learning (assimilation of new course material with the aid of teaching devices or programmed textbooks, reinforcement of acquired knowledge with the utilization of tutoring machines, testing the assimilation of course material in the classroom or self-testing during independent study on automatic testing machines, acquisition of primary practical skills on simulators, etc) should be provided at all stages of learning, in all types of learning effort, wherever expedient, methodologically justified, economically advantageous and effective.

The particular methodology of each discipline taught at a military educational institution will determine the specific place of programmed learning. In addition, the requisite number of technical devices and corresponding course materials will be determined for each discipline, a point which also applies to other technical learning devices and visual learning aids.

With this approach to elaboration of particular methodology, employment of programmed learning in military educational institution courses will not only be an activity for enthusiasts but also a methodologically substantiated necessity for all instructors.

The proposal made by the author of the article that scientific research effort in the area of programmed learning be centralized definitely merits attention.

Col I. Vakurov

* * *

At the present time two basic ways to improve the learning process are being examined. The first constitutes extensive adoption of programmed learning methods in the curricular process at military educational institutions. The second constitutes automation of the learning process.

In his article Lt Gen P. Vashurin discusses the first method in detail. The author does not limit himself to the framework of past interpretation of programmed learning and does not reduce improvement of the curricular process merely to elaboration and adoption of programmed learning means and devices. He advances and substantiates a thesis of expanded interpretation of the very term "programmed learning."

We consider this statement of the problem to be absolutely correct. It is not solely and not so much a question of employing programmed devices in teaching within individual branches of knowledge, of elaborating particular methodologies of studying a given discipline and finding on the basis of these methodologies ways to present subject matter or individual sections of discipline content with utilization of programmed means and methods. All these are particular, separate parts of that great whole which constitutes improvement of the learning process on the basis of programmed learning. The entire learning process should be programmed, not only individual sections pertaining frequently to a limited number of disciplines. And this must be done in two areas. First of all one must apply the principles and ideas of programmed learning within the presently existing or, as it is called, "traditional" learning process. Secondly, it is necessary to elaborate in detail and adopt technical devices and methods of programmed learning in the study of various disciplines. We, just as the author, feel that the first area is of primary importance at the initial stage.

In connection with this it is necessary first of all to determine the optimally necessary volume of knowledge in each discipline. For this it is necessary to know solidly and in detail the demands imposed by line units on military educational institution graduates, which in turn will predetermine the scope of information forming the requisite knowledge, as well as its breakdown into separate doses of information in a rigorously logical sequence, with unnecessary duplication eliminated. In order to accomplish this task we have utilized the principles of programmed learning and methods of critical-path planning and management. The former have enabled us to break down the requisite knowledge to optimally essential doses, and the latter -- to structure and optimize a learning process flowchart on the basis of volume and scope of knowledge.

This optimization has made it possible to revise the scope and content of various disciplines in the curricular process and in the final analysis to elaborate new programs in regard to scope and subject matter. It was necessary to find a reasonable and efficient ratio of forms of teaching: lectures, group and practical exercises, exercises dealing with comprehensive and departmental problems, in classroom and field, independent study, taking into consideration various indicators pertaining to range of achieved performance within a single group of students, range of topics covered, range of current performance results, degree of feedback between student and instructor, etc.

On the basis of solving problems dealing with optimization of the scope and range of a given course at our educational institution, we have been able sharply to increase the degree of student independent effort and to reduce somewhat the number of lectures.

Elaboration of all curricular materials is permeated with ideas of programmed learning on breakdown of course material into individual doses of information, with an endeavor to achieve a high degree of presentation and close logical coordination.

Lectures and other classroom exercises are being re-examined from the standpoint of the requirements of programmed learning and methodology. We are applying basic principles of sequential presentation of major doses of knowledge and support of maximum feedback with the students.

On the whole, application of the principles of programmed learning in order to improve and optimize the learning process constitutes the most important direction in applying these principles to the curricular process.

We also consider creation and utilization of programmed means and devices in the learning process as a second area for improving learning. In our opinion the most important thing now is extensive adoption of means of machineless programmed learning. This is dictated by the fact that at the majority of military educational institutions of operational-tactical specialization, insufficient experience has been acquired on programming course materials (breakdown into individual doses of information, logical linking of doses, elaboration of test questions and variant answers tailored to the information doses, formulation of confirmation and explanations accompanying answer, etc). An important task is elaboration of programmed textbooks, the principal virtue of which is the capability of continuous student self-testing of assimilated material.

It is true that programmed textbooks, alongside their positive aspects, possess substantial drawbacks: the coverage rate is 25 to 50 percent slower than conventional text materials; their elaboration is extremely laborious and complicated; their quality is determined not only by the author's level of knowledge on the subject but also his knowledge of the rules and techniques of preparing such materials. In spite of this fact, programmed textbooks are making it possible sharply to improve the quality of learning a discipline, particularly in the course of student independent work with course materials.

Utilization of electronic devices in programmed learning should be the final stage in its adoption and should occur in conjunction with automation of the learning process.

We share Lt Gen P. Vashurin's opinion on the advisability of a systems approach to the utilization of electronic devices in programmed learning, and we fully support his recommendation that electronic devices be employed in a centralized manner.

Essentially two variants of centralization of equipment are possible: by department or area of study; on a scale of the school as a whole.

With the first variant each department (area of study) programs its own curricular material and elaborates a program and schedule for operation of the electronic equipment at its disposal. Study is conducted on the basis of department (area of study), with utilization of textbooks programmed to be compatible with the various technical devices.

With the second variant, department (area of study) programmed textbooks are fed into the general-use electronic device each time classes or exercises involve the given department (area of study).

An advantage of the first variant is stability of setup and operational readiness of the electronic device and its utilization during the learning process. A disadvantage is the comparatively high cost. The second variant is more complex in preparation and utilization of programs, but it is economically more advantageous. We consider it fundamental for military educational institutions.

The operational-tactical demands on programmed learning electronic devices with centralized utilization have been specified in Lt Gen P. Vashurin's article. They are in full conformity with modern stationary computers, particularly the Minsk-32 digital computer. This computer can be used to build a centralized system of programmed learning and to achieve automation of the learning process.

Professor Col A. Butivchenko, Doctor of Military
Sciences

ON THE QUESTION OF THE SCIENCE OF TROOP CONTROL

Considerable attention is presently being devoted to elaboration of the scientific principles of troop control. This explains the interest being shown in an article by Maj Gen Engr-Tech Serv A. Tatarchenko entitled "Science of Troop Control."*

This is not the first time this journal has addressed the above subject, but this time science of troop control is discussed on a more specific basis. The author has endeavored (and we feel, with some success) to define the subject and structure of this science, its place in military science in general, and to express his opinion on one of the most important and complex questions -- criteria for evaluating effectiveness of control.

We shall discuss in greater detail the structure of the science of management.

First of all we shall determine whether it is necessary at all to define the structure of science of management, and if so, why? Would it not be better, in place of a general discussion, to concentrate our efforts on elaboration of concrete, specific problems?

Lenin gives the most precise answer to these questions: "...He who addresses particular problems without first solving general problems will inevitably and unconsciously encounter these general problems at every step. Blindly to encounter these problems in each particular case means to doom one's policy to the worst wavering and lack of principles" (Poln. Sobr. Soch. [Complete Works], Volume 15, page 368). As applied to the science of troop control this means how correctly we define the content and structure, how successfully its development proceeds and practical effectiveness is achieved.

Carefully examining the structure of science of troop control proposed by Maj Gen Tatarchenko, one can easily see that in addition to certain points which have been sufficiently fully elaborated, there are some items which are in the beginning stages of development, in spite of their undisputed importance (for example, criteria and standards of assessing effectiveness of troop control). Just as the periodic table of elements, in addition to all its other virtues, helps scientists obtain their bearings in scientific quest and to discover previously unknown (but predicted) elements, a well-founded structure of science of management will make it possible correctly to determine its paths of development, to find individual problem points and promptly to focus efforts on resolving

* Voyennaya Mysl', No 6, 1970.

these points. Without this the planned development of science as a whole is impossible.

While we agree with the basic points made by the author of the article, we should like to make some comments.

As is well known, the physical foundation of any complex control system is made up of people and technical devices taking part in the control process. In view of the continuing rapid development of control technology, there is no need to demonstrate the necessity of such an area of science of management as "troop control technology." But we cannot limit ourselves to an examination solely of this portion of the supporting base of control and ignore another important segment -- the persons involved in management and control functions.

This is why it seems essential to include in the structure of science of management a separate section which we shall call (tentatively) "management cadres." This section should on the whole discuss matters pertaining to efficient selection and placement of cadres in various management and control systems. Lenin emphasized the importance of this. In a letter to A. D. Tsyurupa he stated that "...the primary task of the moment is not decrees, not reorganizations, but rather selection of personnel; determination of individual responsibility for the job at hand; verification of the work which is going on" (Poln. Sobr. Soch., Volume 44, pp 369-370). Lenin returns to this problem in a number of his writings and documents pertaining to the period of establishment of state management and control entities during the early years of Soviet rule.

Up to the present time science has not yet elaborated any strict, specific theses on this problem. There is no need to demonstrate that at a certain stage in the development of troop control an empirical approach to solving the problem of cadres may become an insurmountable hindrance impeding the achievement of further success in the area of technology, in the area of organization and in the area of management methods.

In the most general form the section "Management Cadres" could consist of the following basic subdivisions:

- general principles of selection and placement of cadres in management systems;

- classification of management positions on the basis of two fundamental indicators: functional orientation (commander, political worker, officer-operator, specialist, etc), and by level of hierarchic echelon of the control entity (subunit, unit, large unit and corresponding commanders, staffs, sections, directorates, etc);

basic requirements on personal properties (characteristics) of individuals in each management slot;

method of determining (measuring) personal qualities in the process of practical activity and in conducting special investigations;

orientation of cadre management training, for the purpose of cadre practical improvement.

It follows from the above approximate content of the section that the most important role is assigned to the problem of professional selection, which at present, in connection with the scientific and technological revolution, has become quite acute in various areas of human activity, including the area of troop control.

We should state at this point, however, that, taking into consideration the present level of knowledge in the area of management, psychology, and heuristic science, it would be premature to state the objective of investigating all levels on the hierarchic ladder. At the present time problems of occupational selection are being successfully solved only in those specialist categories such as radar operators, vehicle drivers, pilots, etc, that is, persons for control functions at the "man-machine" level; that is, these studies are far from completion.

The higher the control system level we subject to such an examination, the less success we can anticipate. This is understandable, since the more creative man's activity is, the less readily it submits to investigation. And yet it is generally acknowledged that the activity of the military commander pertains to the category of the most innovative and difficult. The boundaries of such investigations can be elucidated with relative precision only in the course of investigation proper, although it can already be assumed that in the foreseeable future they will not exceed, in the military, the level of regimental commander (ship captain). But even this level (if only because of the large number of persons involved) is an important object of investigation by science of management.

With addition of this section to "Structure of the Science of Troop Control" we should eliminate "Demands on Command Cadres" from the first section (subsection 8).

Up to the present time there has been a considerable amount of materials published on various problems of science of management. There has been little practical effect, however, in this area from the achieved level of knowledge. There are evidently several reasons for this, the aggregate of which can be characterized as the absence of the element of "self-improvement" in existing complex control systems. In order to eliminate

these causes, that is, to achieve a constant control system tendency toward improvement, it is essential to elaborate special methods, procedures and technical devices for investigating control processes. In connection with this it seems expedient to isolate within the proposed structure of science of troop control a separate section which could be called "Improvement of Control System" and could encompass the following main subsections:

- 1) organization of research in control and management;
- 2) methods of investigation and improvement of control and management systems;
- 3) technical devices for investigation in the area of control and management;
- 4) organization of training of management cadres (theoretical training);
- 5) methods of teaching management science;
- 6) forms and methods of practical adoption of results achieved by management science;
- 7) methods of determining achieved effectiveness of control.

We shall explain in somewhat greater detail the content of each of the above subsections.

The first subsection, taking into account the volume of requisite research in management and control, will issue recommendations on the following matters: who should engage in a given investigation, and with what personnel arrangement; how should the research be organized (for example, should special investigator teams be set up, what arrangement and how many, under whom, where should they fit organizationally?); what research can be performed by officers in addition to the performance of their primary duties. Consequently, the first subsection, under conditions of a constantly changing situation, development of knowledge, forms and methods of management and control, will make it possible to find the correct way to meet the demands and principles advanced by general theory of management.

Special methods and entire methodologies of investigating management and control processes will be elaborated in the second subsection (for example, how to measure various flows of information, temporal indices of individual processes, psychophysiological and intellectual parameters of the individual, etc).

The third subsection should provide the investigator with requisite special and multipurpose technical means enabling him to implement research methods in the area of management and control.

The fourth and fifth subsections will make it possible to determine the amount of special training for those persons who will be employed in management in various posts, who will be elaborating and perfecting training programs and methods, taking into account the specific features of the training establishment and the students, and who will be obtaining a reasonable organization of information efforts among management specialist officers.

While knowledge on management and control elaborated and synthesized up to the present time cannot be considered a science, a scientific discipline should be constructed on this base, which should be taught to one extent or another at various training establishments. The history of science contains many examples of how extremely valuable discoveries saw no practical implementation or were utilized only partially for a long period of time. There can be many different reasons for this. Sometimes, for example, it involves a certain "inertness" inherent in man, that is adherence to old, tested methods and means of labor, and sometimes with certain side complications caused by adoption of the new. But in most cases adoption of scientific advances demands not only the persistence of the enthusiast but also the knowledge of the specialist. The sixth and seventh subsections should be devoted to elaboration of this knowledge.

With the treatment of these items in a separate section of management science, "Methods of Studying Problems of Management and Control at Educational Institutions and Their Development During Troop Combat and Operational Training" (Subsection 12) can be eliminated from the first section, "Structure."

Thus, while the first section of science of control -- "Theory of Troop Control" -- defines its principal areas and specifies points of departure for investigation within the area of all succeeding sections, this section will provide a scientifically substantiated "process" for improving management and control.

Considering science of troop control as new and not yet completely formulated, one must bear in mind that it is inconceivable to make considerable headway in the area of management and control without employing a new scientific edifice. This edifice has now begun to appear in the form of the theory of large systems mentioned by Maj Gen Tatarcheko and which he calls one of the scientific foundations for elaboration of organization of troop control.

Study of control processes is inconceivable without a systems picture of all elements participating in the given processes. Presently-known studies in the area of theory of systems are for the time being more theoretical in nature, although studies have to some extent been given practical application in designing various technical systems and weapons. There is no doubt that in the fairly near future theory of large systems will become practically the main instrument of management science.

Therefore it seems logical to include the subsection "Problems of Application of General Theory of Systems to Troop Control" in the first section, "Structure" -- "Theory of Troop Control." A central item here, in our view, will be methodology of systems analysis of management and control processes, taking into account the entire aggregate of aspects of management science: organization, hardware, personnel and management methods.

In conclusion we should note that management science is presently at a stage where further elaboration and particularly practical implementation of its achievements require substantial material and organizational support. Existing Soviet and foreign experience in scientific approach to management has persuasively demonstrated that the outlays involved are repaid many times over by the gains achieved.

Capt 2nd Rank K. Dubravin, Candidate of
Naval Science, Docent

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The considerable attention being paid to an article by Maj Gen Engr-Tech Serv A. Tatarchenko entitled "Science of Troop Control" is due not only to the increasing importance of this problem but also the novelty of its statement by the author. Materials published up to the present time have contained merely preliminary and perhaps comparatively timid attempts at elaboration of a theory of troop control. The principal contribution of Maj Gen Tatarchenko is, in our opinion, the fact that he has taken a step forward and has boldly addressed the question of further and fundamental elaboration of the science of troop control.

The overall statement of the problem in his article generates no objection, but we cannot agree with the author's statements on such fundamental items as the subject of science of troop control and its relationship with other component parts of military science.

The author proposes that science of troop control be limited to investigation only of extremely general problems of control. As regards specific tasks of control of services and arms at various echelons and under various conditions of conduct of combat operations (attack, defense, etc), they should be dealt with not by control science but rather by strategy, operational art and tactics respectively.

With this statement of the problem we shall find first and foremost a certain gap between science of troop control and the above-mentioned component parts of the art of warfare and military science as a whole. In addition, such an abstract science of troop control, detached from concrete, practical affairs, is useless, since it will produce no practical benefit.

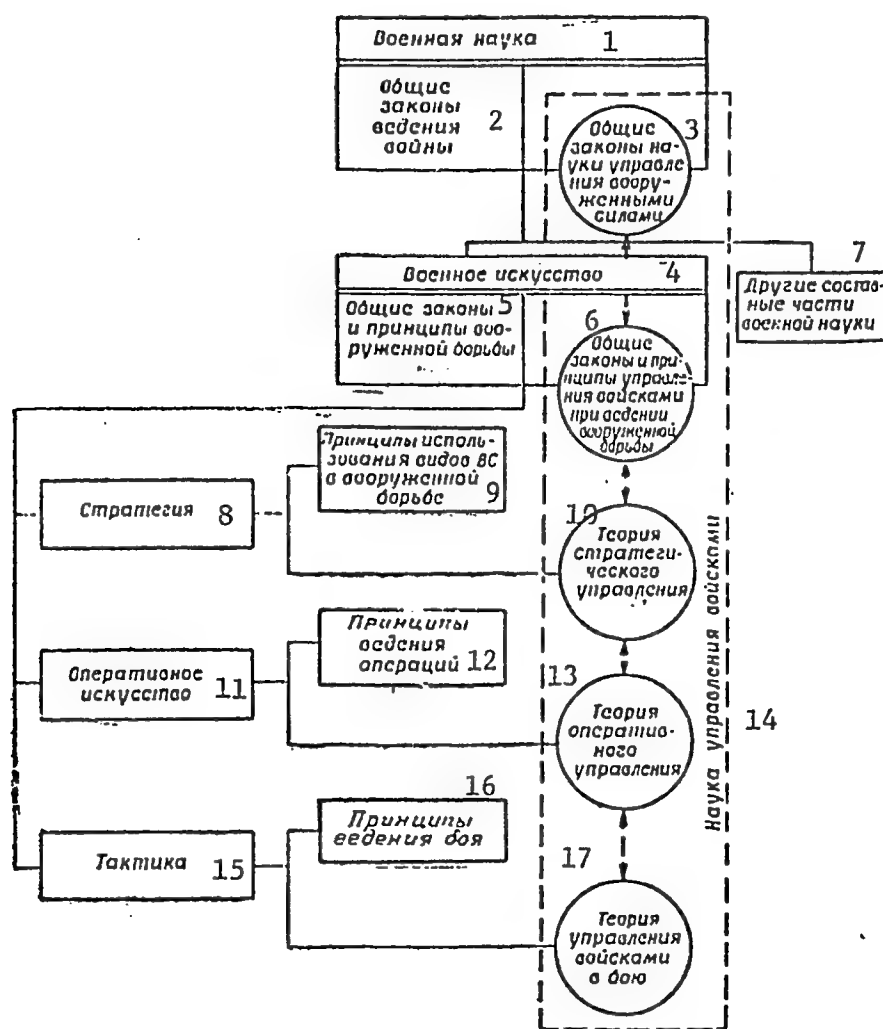
Every science, in addition to general theses, is concrete in character and helps solve purely practical problems; for this reason it is called a science. Obviously science of troop control should not only deal with general matters of theory but should also assist commanders and staffs of the various echelons in successfully carrying out specific measures of troop control, should teach practical work methods in specific types of combat (operation) and situation conditions (collection and study of situation data, planning of combat operations, assignment of missions to troops, organization and implementation of troop coordinated actions, etc). Only then will it be entitled to exist and grow

Consequently we should be discussing not separation (detachment) of science of troop control from military science but rather differentiation of the latter. Only under this condition will science of troop control become an organic component part of military science, including military art (see diagram). In recent years such a differentiation has been observed in many other fields of knowledge.

The author's fears that in such a case science of troop control will be too broad, will lack visible boundaries, are groundless. The boundaries are established by combat realities proper, from which one must proceed in resolving this matter, for no genuine science can be concocted. It can arise only on the basis of life itself, reality.

A careful analysis of combat developing in a theater of military operations clearly reveals two of its components.

First of all there are the actions of the troops proper, that is soldiers organizationally contained in subunits, units, and large units. With fire and attack troops destroy enemy personnel and equipment, execute maneuver, shift to reserve, etc or support all these actions (conduct reconnaissance, build roads and bridges, transport ammunition, etc). The first component part of military science, military art, as well as (depending on scale) strategy, operational art and tactics should study the above troop actions under various situation conditions. This part -- we shall call it science of conduct of combat operations -- reveals the general laws, patterns and principles of the conduct of war as a whole, as well as operations and engagements of various scope, and must provide a clear and precise answer to the question of how troops should operate under various situation conditions.



The place of science of troop control in the overall system of military science

Key to figure: 1 -- military science; 2 -- general laws of war; 3 -- general laws of science of armed forces control; 4 -- military art; 5 -- general laws and principles of warfare; 6 -- general laws and principles of troop control in the conduct of warfare; 7 -- other components of military science; 8 -- strategy; 9 -- principles of employment of armed forces branches in combat; 10 -- theory of strategic control; 11 -- operational art; 12 -- principles of conduct of operations; 13 -- theory of operational control; 14 -- science of troop control; 15 -- tactics; 16 -- principles of conduct of the engagement; 17 -- theory of troop control in combat

Secondly, in a theater of military operations there occurs activity of corresponding commanders, staffs, chiefs of arms (services) and the party political edifice in the execution of various measures connected with troop control. This activity should be studied by the second component part of military science, military art, as well as strategy, operational art and tactics. Its task is to elucidate not only the general laws, patterns and principles of troop control but also to answer the questions of what control entities there should be, what control equipment they should be provided, and how they should work and carry out specific measures connected with control under various conditions of combat operations (collect and study situation data, perform computations, decision-making and formalization, communication of missions to subordinates, etc). This part will comprise the content of science of troop control.

This approach by the author of the article to the subject of science of troop control has inevitably engendered a substantial deficiency in determining the procedure of teaching officers problems of troop control at educational institutions. In his opinion only general theoretical principles should be studied within the framework of a course on troop control, while all applied problems of management and control should be studied within the framework of appropriate operational-tactical and special disciplines (course on strategy, operational art, tactics, etc). The author claims that otherwise there will occur an impoverishment of the latter. He notes that the truth lies on some middle ground. We cannot agree with this opinion either.

The system proposed by the author for teaching officers troop control is not new. It has been practiced for many years at our educational institutions and nevertheless has not fully proven itself, since in this case problems of control have been given secondary priority, and there has not always been adequate time to work on them. In the same case, when the instructor attempted to devote more attention to problems of control, purely tactical (operational) items pertaining to troop actions proper would be neglected.

Theoretical research and some practical experience obtained in recent years at the Military Academy imeni M. V. Frunze permits us to propose a somewhat different and in our opinion more effective procedure for officer training. It consists essentially in sequentially working on problems of utilization of manpower and equipment in a given type of engagement (operation) at the first stage of study in a course on general tactics (operational art) and tactics of arms at lectures, seminars and group exercises. Trainees receive thereby a thoroughly-substantiated answer to the question of how troops should operate (subunits, units, large units of the various arms) in preparing for and conducting specific combat operations under various situation conditions.

Parallel to this, officers acquire at lectures, seminars and group exercises in a course on troop control knowledge and skills which enable them to answer the question of how corresponding commanders and staffs should proceed in carrying out various control measures in a given type of engagement (operation) as well as under various situation conditions.

To illustrate the above we shall give the example of organization of the teaching process in working on the following general topic: "The attack, involving a hasty river-crossing operation." In a course on general tactics, in this instance particular topics of lectures, seminars and group exercises may be the following: disposition of units in assembly area; sequence of their advance and deployment; conduct of preparation fire; actions in case of hostile counterpreparation fire; types and procedure of river crossings; sequence of river-crossing operation and penetration of the enemy's defense; repulsion of enemy counterattack; engagement of support echelons; pursuit of the adversary; meeting engagement with enemy reserves, etc.

In a course on troop control, parallel with classes on tactics and on a common tactical background, one can work on such particular topics as the procedure of acquisition by commander and staff of an attack operation order from the higher commander, collection and study of situation data, commander decision-making and decision formalization for an offensive operation (in various combat documents), communication of combat missions to troops and organization of their coordinated action by various methods, comprehensive support and preparation of troops for combat operations, organization of command posts, communications, coded communications, traffic control, verification of readiness of units for the attack, control of units during the attack.

It is easy to see that there will be no impoverishment of tactics with such training, since the range of study items is extraordinarily large and complex. In addition, work on these items under various situation conditions will make it possible to eliminate stereotype and to teach officers the real art of conducting combat operations, while division of exercises in the course on troop control will make it possible to develop initial knowledge and skills in supervising units by the large unit commander and staff.

At the second stage of training on this topic one can hold test exercises, staff drills, war games and command-staff exercises, at which problems of subunit and unit tactics and problems of control are worked on (reinforced and consolidated) in an organic unity by the joint efforts of all departments, with the tactics department dominant.

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SOVIET MILITARY ORGANIZATION AND ITS HISTORICAL FORMS

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Soviet military organization dates from the establishment of the Soviet State. Its content and forms have been steadily improved and perfected parallel with the development of socialist society. The Communist Party, exercising supervision over military organizational development, has innovatively utilized the wealth of historical experience of the revolutionary manifestations of the proletariat, profoundly and comprehensively considering the character of the domestic and international situation, the nation's economic potential, the level of armed development, and potential methods of weapons utilization in wars in defense of the socialist homeland. A study of this complex process is not only of historical-cognitive but also of scientific-theoretical significance for resolving the problems of military organizational development in the present day.

Problems of the development of Soviet military organization have been little investigated in our military-philosophic and military-historical literature. In many studies the very term "military organization" is interpreted in various ways. In the one case it is equated with the Soviet Army or Soviet Armed Forces, while in another case it is assumed that the cadre armed forces of the Soviet Union and the other socialist nations comprise only the foundation of their military organization.¹ In this article we intend to examine briefly the content of Soviet military organization and its historical forms at various stages of organizational development of the Soviet state.

The Founders of Marxism-Leninism on Military Organization of the Exploiter Society and the Toiler Masses

The deathless legacy of the founders of Marxism-Leninism constitutes the ideological-theoretical foundation for scientific investigation of the content of Soviet military organization and its historical forms. Their writings contain a profound analysis of the causes of origin, the political purpose and tasks of military organization of a socialist and an exploiter state.

The principal cause of development of the military organization of the exploiter society, as was emphasized by the founders of Marxism-Leninism, was the *split of society into irreconcilably hostile classes*, caused by the economic and social conditions of historical development. An unequal level of economic and political development, state of the military and the different character of resistance of the masses to the exploiters dictated

the appearance of varied forms of organization of the coercive agencies of the exploiter society: the army, the police, various militia and other entities.

Friedrich Engels, an expert on military affairs, gave a classic definition of army. "An army," he wrote, "is an organized association of armed individuals maintained by the state for the purposes of offensive or defensive warfare" (K. Marks and F. Engel's: Soch. [Writings], Volume 14, page 5). The founders of Marxism-Leninism clearly defined the sociopolitical role of the army in an exploiter society, viewing it as an analog, a copy of that society. "...The army," commented Lenin, "just as the means of production, was formerly an instrument of oppression in the hands of the exploiter class" (Poln. Sobr. Soch. [Complete Works], Volume 36, page 485). The reactionary role of the army was intensified to an even greater degree in the capitalist society. The bourgeois army, wrote Lenin, is the most rigid instrument of support of the old system, the most hardened bulwark of bourgeois discipline, the support of the domination of capital, the preservation and indoctrination of slavish submission and subordination of the toilers to capital. The profoundly antipopular, reactionary role of the bourgeois army as an instrument of the class domination of the imperialist monopolies is manifested today particularly forcefully.

In addition to permanent, regular armies, the ruling classes of slaveowning, feudal and capitalist societies employed *various militia forms of military organization*. A scientific analysis of the organizational aspect of these forms is contained in the writings of Engels and Lenin. The founders of Marxism-Leninism defined as militia organization an organization whereby the members of society possess a mastery of weapons, military knowledge and skills necessary for carrying out a military function in addition to other occupations (see Marks and Engel's: Soch., Volume 2, page 539; V. I. Lenin: Poln. Sobr. Soch., Volume 31, pp 32-33).

Studying the lessons of the U.S. Civil War (1861-1865), Engels concluded that militia organization in any form is possible only with the presence of a regular cadre army as an organizing nucleus. "No army organized of civilians from the ground up will ever be able to become combat capable if it is not trained and supported by the vast intellectual and material resources at the command of a large regular army, and particularly that organization which comprises the most powerful aspect of a regular army" (Marks and Engel's: Soch., Volume 15, pp 413-414).

Examining the militia form of military organization of an exploiter society, the founders of Marxism-Leninism noted that it, just as the army, is divorced from and opposed to the toiler masses. Lenin, examining the bourgeois militia, wrote that "an increasing Prussianization of the militia is taking place... it is being prostituted by the mobilization of troops against strikers" (Poln. Sobr. Soch., Volume 30, page 141).

Engels also called guerrilla entities of a nonarmy type militia troops. He considered them less prepared than regular troops in an organizational respect, and he therefore concluded that guerrillas can harass the enemy, disrupt his communications, seize or destroy his supply trains, at the same time avoiding a serious engagement and "withdrawing into the forest or swamp upon the appearance of a large body of regular troops." At the same time Engels believed that utilization of guerrilla forces is essential under certain historical conditions.

The founders of Marxism-Leninism also included police in the military organization of the exploiter state. "A regular army and police," emphasized Lenin, "are the principal instruments of government authority..." The police, as the army, is a special organization of armed individuals under bourgeois command, separated from and opposing the people. In contrast to the army, however, it performs only an internal function of suppressing the toiler masses.

In addition to the army, police, and militia organizations, the imperialists make extensive use of various militarist organizations financed by monopolies, in their class interests. These organizations play an important role not only in the dissemination of military knowledge but also in the organizational and political preparation of broad segments of the population for participation in armed combat for the interests of the capitalists.

As we see, the founders of Marxism-Leninism, examining the content and forms of military organization of the exploiter society, did not restrict themselves to the army alone, although they did stress its principal role, but examined all forms of military organization of the state. They also substantiated the necessity of military organization of oppressed, exploited classes.

Lenin wrote that in any exploiter society the "oppressed class endeavors to create a new organization of this type, capable of serving not the exploiters but the exploited" (Poln. Sobr. Soch., Volume 33, page 10). Only one class, however -- the proletariat, led by a Marxist-Leninist party -- is capable of accomplishing this historic task. The founders of Marxism-Leninism scientifically demonstrated, and history has confirmed, that in order for the proletariat to gain victory over the exploiters it is necessary to create a military organization of a new type, capable of destroying the instrument of coercion of the exploiter state and defending revolutionary gains.

The very term "military organization" as a toiler instrument of power was first mentioned by Lenin in his article "The Revolutionary Army and Revolutionary Government," written on 10 July 1905. Analyzing the specific conditions of revolutionary struggle, he concluded that "only by force is

it possible to settle great historic questions, and organization of force in the present-day struggle is military organization." Lenin explained that the only such force under these conditions is an armed people headed by an armed proletariat.

Practical revolutionary activity advanced before the party the problem of selecting specific forms of military organization of the proletariat in a bourgeois-democratic and socialist revolution. Lenin taught a careful approach to selection of forms of military organization and methods of combat which, regardless of the newness of historical tasks, should not be divorced from past experience or elaborated out of contact with it. "Marxism," he wrote, "in this respect *learns*, if we can use this expression, from mass experience, and is far from claims of *teaching* the masses forms of struggle concocted by 'armchair experts'" (Poln. Sobr. Soch., Volume 14, page 2). In this connection Lenin time and again appealed to party members not only to study the forms of military organization but also to enlighten the masses about them, to assimilate them, to be prepared for a swift change in methods of struggle and forms of organization for this struggle, as dictated by objective conditions.

Even before the October Revolution Lenin considered in theory a regular cadre army to be the most perfect form of military organization. He wrote in the summer of 1915: "Let us take the modern army. Here is a good example of organization. And this organization is good only because it is *flexible*, and yet at the same time capable of imparting to millions of individuals a *single will*" (Poln. Sobr. Soch., Volume 26, page 258). Prior to seizure of power by the proletariat, however, and creation of the requisite political, economic and organizational conditions, Lenin and the Communist Party did not advance this form of military organization on a practical political plane.

Lenin stated that in selecting forms of military organization the party should, basing itself on the organizational experience of the past, take into consideration the specific historical situation and tasks to be accomplished, taking into consideration both *direct military factors* -- type of combat, correlation of military forces, the enemy's methods of operation, level of development of military science, etc, and *sociopolitical and economic factors* -- correlation of class forces, societal and government structure, economic conditions, character of the anticipated war, the leadership role of the worker class and its vanguard, the Communist Party.

Lenin called the revolutionary army the military organization of the forces of the revolution. He pointed out that the military strength of a revolutionary people (not the people in general, as the Mensheviks asserted) "consists 1) in an armed proletariat and peasantry; 2) in organized forward detachments of representatives of these classes; 3) in troop

units willing to take the side of the people. All these together comprise a *revolutionary army*" (Poln. Sobr. Soch., Volume 11, page 365). At the same time Lenin directed the attention of the delegates at the 3rd Congress of the Russian Social Democratic Labor Party to Marx's statement that "the workers should be armed and comprise an independent worker guard." He devoted a number of writings to the worker militia, constituting the proletarian guard: "Letters from Afar" and others.

Lenin made a thorough and comprehensive study of guerrilla warfare and its organizational forms. "Guerrilla warfare," he wrote, "is of great interest to our party and the worker masses." He underscored the importance of understanding what historical conditions engender this struggle and the form of military organization connected with it, explaining that the party of the proletariat cannot consider guerrilla warfare "the sole or even the main vehicle of struggle, that this vehicle should be subordinated to others, should be commensurate with the principal means of struggle, should be improved by the educational and organizing influence of socialism" (Poln. Sobr. Soch., Volume 14, page 9). Lenin saw the advantages of the revolutionary method of waging war and a guarantee of victory in utilization of the diversified forms of military organization.

Various forms of military organization of the toiler masses, united, as Lenin stated, "on the basis of class armament," were readied and utilized under the guidance of the Communist Party for accomplishment of the socialist revolution in Russia. Precisely coordinated actions by all forms of proletarian military organization along with the political and ideological struggle of the Communist Party ensured establishment of a dictatorship of the proletariat in this country within the shortest possible time.

Soviet Military Organization During the Civil War and Military Intervention

Bearing in mind the complexity of the historical conditions under which the dictatorship of the proletariat was established in this country, and the inevitability of military clashes between the Soviet republic and the bourgeois states, Lenin concluded that "the proletariat, if it wants to and intends to rule, must demonstrate this with its military organization as well."

Lenin assigned a decisive role in military organizational development to a dictatorship of the proletariat, Soviet rule, the Communist Party. "Soviet rule alone," he emphasized, "as a permanent state organization of the classes formerly oppressed by capitalism, is capable of putting an end to subordination of the military to bourgeois commands and genuinely to merge the proletariat with the troops, genuinely to effect arming of the proletariat and disarming of the bourgeoisie, without which the victory of

socialism is not possible" (Poln. Sobr. Soch., Volume 37, pp 500-501). In order to accomplish this historic mission it was extremely important correctly to settle the question of selection of forms of Soviet military organization.

The first such form was the *Red Guard*, established in February 1917 and consisting of industrial workers. It constituted the main striking force both in the October Revolution and during the period of the general "Red-Guard assault on capital." Regular units of the old army and navy, which were in a revolutionary mood, acted in conjunction with the Red Guard. The Red Guard was a worker militia, combining military functions with governmental and societal functions. In addition to the struggle against counterrevolution, the Red Guardsmen, the revolutionary soldiers and sailors became the armed foundation of Soviet power and the defenders of the social order.

With consolidation of the Soviet state, the Communist Party carried out a number of measures ensuring that the Red Guard approach the form of regular armed forces, introducing Red Guard service obligation and government support. By the end of April 1918 the Red Guard, 100,000 men strong, had totally merged into the new Red Army, becoming its proletarian nucleus.

The military effort against the German invasion in February 1918 confirmed the necessity of creating a permanent, regular army. Lenin felt that it would be intolerable and fatal to initiate a war with a professional opposing army if the proletariat did not have an organized army itself. Heaping scorn upon the Socialist Revolutionaries and "leftist" opportunists in the party for their demands that volunteer militia (guerrilla) forces be organized in place of a regular army to engage the German interventionist forces, Lenin stated that such demands were ridiculous to any soldier, for they were contrary to the logic of military realities and failed to take into account methods of combat. In spite of the fact that a militia form had been outlined for future military organizational development under socialism, Lenin and the Communist Party, under conditions of an invasion by foreign interventionist and White Guardist armies, correctly assessed the specific historical situation and concluded that it was essential to establish a regular Red Army.

Setting up an army which was professional in both organization and training, the party, as stated at the 8th Party Congress, in no way was scrapping the militia program as such. During the Civil War the militia principle of military organizational development found expression in other forms, which supplemented and strengthened the Red Army. One of these forms was *Vsevoluch* [universal military training].

The resolution on war and peace drafted by Lenin for the 8th Party Congress emphasized that the primary and fundamental task of the party, of the entire vanguard of the conscious proletariat and the Soviet government, along with other measures to strengthen the republic, was "adoption of the most vigorous, mercilessly resolute and draconian measures to achieve... comprehensive, systematic, universal training of the adult population, regardless of sex, in military knowledge and military operations" (Poln. Sobr. Soch., Volume 36, pp 35-36). These party instructions were made official by a decree issued by the All-Russian Central Executive Committee on 22 October 1918, calling for universal military training for toilers. The main task of Vsevoluch was the readying of militarily-trained reserves for the Red Army. This was not the limit of its activities, however; Vsevoluch units also performed other important functions of the socialist state -- together with the extraordinary commissions they crushed the resistance of the overthrown classes and together with the Red Army took part in organizing national defense.² Communists were the initiators in organizing Vsevoluch.

In May 1919 A. Ye. Mar'yasin, Chief of the Main Administration of Vsevoluch, reported to Lenin: "In all the major cities along the Volga, in Nizhniy Novgorod, Kazan', Simbirsk, and Saratov, Vsevoluch cadres set up in advance have made it possible to deploy Vsevoluch forces and to establish powerful worker regiments, permeated with revolutionary spirit, for the *immediate defense of the above-named cities*"³ (Our italics -- Auth.). The largest contingents were established in Moscow and Petrograd. They were organized on a territorial-militia basis and essentially constituted a worker militia strengthening the republic's home front.

The historic role of Vsevoluch consisted primarily in the fact that in the period 1918-1920 more than 5 million military reservists were trained in its system, without separation from their normal duties;⁴ together with Cheka units and other organizations they provided reliable defense of the home front against domestic counterrevolution. Vsevoluch, in contrast to the Red Guard, possessed a broader social base. Its operation was largely paid for with public funds, and supported by the initiative of the worker class and toiling peasantry.

We should also mention the *special-purpose units* set up on a militia basis and on the regular principles of military organizational development. Their appearance during the Civil War years was quite logical. Occupied with the business of repelling the foreign armies and White Guardists, the young Red Army was unable to allocate sufficient manpower and means to put down dangerous foci of domestic counterrevolution, which was employing the most insidious methods of combatting Soviet rule: provocations, sabotage, banditry, and counterrevolutionary propaganda. This demanded mobilization of local Communists, Komsomol members and toilers dedicated to

the revolution, for arm^{ed} defense of the Soviet government, the establishment of a special organization. It consisted of special-purpose detachments and units set up on the basis of a directive issued by the Party Central Committee in March 1918 entitled "Arming Communists and Giving Them Military Training," as well as other directives. In addition to Communist contingents, the special-purpose units included trade-union and Komsomol detachments, which totaled approximately 30,500 men by the end of 1919,⁵ and 371,869 men by December 1921.⁶

The special purpose units played an important role in the struggle against counterrevolutionaries in the rear areas and greatly assisted the front. They existed up to the mid-twenties. In connection with an improvement in the domestic and international position of the Soviet Republic and a strengthening of the Red Army, the special purpose units were disbanded in 1924-1925, and their personnel were employed to strengthen the party stratum in Worker-Peasant Red Army units.

The Communist Party displayed a high degree of flexibility and an innovative approach in utilizing the rich arsenal of forms of military organization of the worker class and toiling peasantry for successful defeat of our enemies and defense of revolutionary conquests. Soon after organization of a regular Red Army, the worker class heeded the appeal of Lenin and the Communist Party and organized under the difficult conditions of the Civil War armed *food detachments*, which operated on the basis of Soviet government decrees. Some of these detachments operated as a food requisition army of the RSFSR People's Commissariat of Food, while others worked under the supervision of the All-Russian Central Trade Union Council Military Food Bureau, in contact with the People's Commissariat of Food. In 1919-1920 the food army fluctuated in size from 35,000 to 62,000 men, while the food detachments of the Military Food Office totaled more than 20,000 men.⁷

The food detachments evolved historically from volunteer worker militia units organized to combat the class enemies for grain, to regular *internal security troops* units. Supported by the food detachments, the party was able to carry out its food policy; in addition the food detachments constituted an additional Red Army reserve.

Under conditions of temporary seizure of strategic initiative by the enemy and the capture of a portion of Soviet territory, Lenin and the Communist Party did enormous organizational work to set up *guerrilla forces* behind enemy lines. The guerrilla movement was supported by extensive initiative on the part of the toiler masses, which had risen up in defense of the socialist homeland. Appraising the nature of guerrilla activities, Lenin noted: "Guerrilla actions do not constitute vengeance but rather military operations," pursuing specific political aims. The guerrilla forces, Lenin emphasized, were engendered by powerful economic and political causes,